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# INNOVATION

Supplement to Canada Commerce



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## Editorial:

**T**his month's *Innovation Supplement* presents articles on four of Canada's eight provincial research organizations (PROs). These organizations are major elements of the expanding network of government, university and private sector entities designed to assist Canadian firms in satisfying their scientific and technological needs.

While each PRO is unique in terms of the technologies it addresses and services it provides, they are all designed to promote regionally-relevant R&D and to fill gaps in the existing technology of their region. A large part of their attention is devoted to helping smaller firms to obtain access to technical capabilities they may not be able to afford on their own.

Provincial research organizations can provide firms with access to research and professional support, product testing services, and an array of on-line information services that may save them the cost and time of duplicating research that has already been undertaken.

The PROs do not, however, limit their activities to small and medium-sized firms. With the high degree of specialization in research that now exists, even large firms find it difficult to keep experts from a wide spectrum of specialties on staff.

For example, Texaco Canada turned to the Alberta Research Council and its staff of oil sands experts for assistance in solving problems in this area of its operations.

The PROs maintain extensive links with university and other government research organizations and are, therefore, aware of emerging technologies and technological trends. Often they carry out useful projects in co-operation with these other groups.

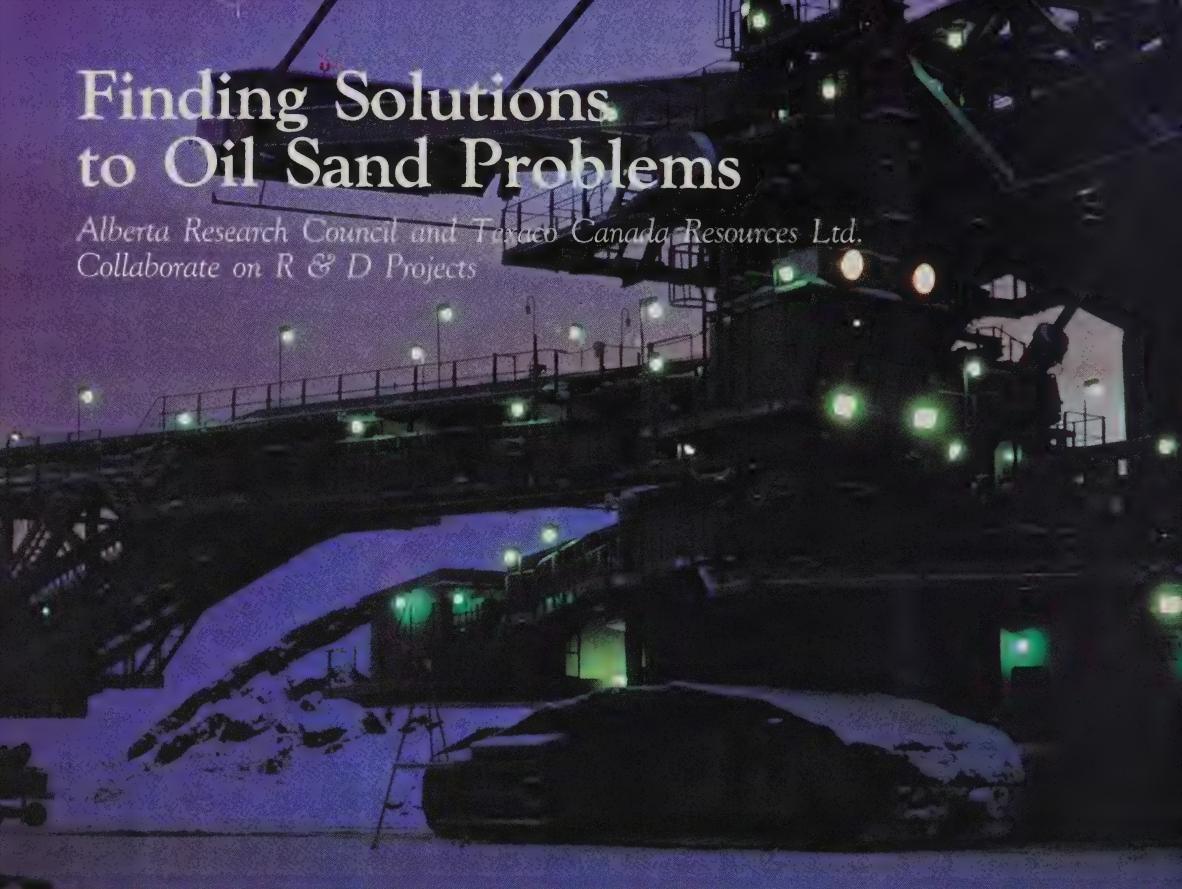
We encourage our readers to learn more about the services and activities of their own provincial research organization.

## Innovation Supplement

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad. Ideas for articles and information, even finished articles, will be welcomed.

We invite you to become a part of the *Innovation Supplement* with your comments and ideas. You can contact us at:

**Innovation Supplement  
Technology Transfer Services (EOII)  
Office of Industrial Innovation  
Department of Regional Industrial Expansion  
235 Queen Street  
Ottawa, Ontario  
K1A 0H5  
Tel: (613) 995-2235**



# Finding Solutions to Oil Sand Problems

*Alberta Research Council and Texaco Canada Resources Ltd.  
Collaborate on R & D Projects*

**W**

hen a major oil company required research facilities in Canada to develop the technology for in situ bitumen extraction from the Athabasca oil sands, the Alberta Research Council was the obvious choice.

That was 14 years ago. Today, Texaco Canada Resources Ltd. is the Alberta Research Council's longest standing client. This collaboration has resulted in the initiation of eight major research projects, the assignment of 34 Canadian and 30 United States patents to Texaco, the development of sophisticated research tools and the publication of numerous scientific papers.

Historically, the Alberta Research Council has been synonymous with oil sands research. Within two years of its establishment in 1921, council scientist

Dr. Carl Clark patented the original hot water extraction process, the basis for the development of the process now used by both Syncrude and Suncor at their Fort McMurray mining operations.

While the technology associated with surface extraction is considered well advanced, only a fraction of the one trillion barrels of bitumen in the Athabasca oil sands can be recovered by mining. In situ techniques are required to coax the remaining, deeply buried, viscous bitumen to the surface.

Research and development to refine existing technologies or invent better methods of extraction have been the focus of the council's Oil Sands Research Department.

By developing an extensive capability in both facilities and scientific expertise in the last decade, the Alberta Research Council has acquired an interna-

tional reputation, part of which can be directly traced to the long-standing association of Texaco and the council.

Texaco holds leases containing an estimated 60 billion barrels of bitumen in the Athabasca oil sands. When the company established a field pilot project at Fort McMurray in 1972, the council's supporting laboratory research was already under way.

In searching for solutions to Texaco's and other companies' field problems, the council constructed a series of highly complex physical simulators which are among the best in the world, and now has 12 simulators capable of handling samples of oil sand from one to 5 000 kilograms.

The simulators include the Core Evaluation Facility, a small but extremely useful simulator for conducting a large number of screening experiments, and the



*Alberta Research Council  
has long been involved in  
oil sands research.*

commercially available prepack systems. They determined that most materials could not withstand the downhole conditions encountered with in situ steam operations.

The council's Dr. Petre Toma suggested that metallic fibre might be a suitable filter element. Texaco carried out the design work and produced a prototype filter composed of compressed metallic wool inserted in a self-standing cartridge. In 1984, a U.S. patent for the filter was granted and assigned to Texaco by the inventors, Dr. Declan B. Livesey of Texaco Canada Resources Ltd. and Dr. Toma.

The construction of the "sandwich" filter is a new concept in the oil patch. Initial field tests have shown the sand filter's ability to withstand the harsh environment typical of thermo recovery in oil sands extraction and that it is efficient and cost-effective.

The Alberta Research Council continues to monitor the device during long-term field tests which are in progress at the Texaco Athabasca Pilot Plant near Fort McMurray. It also underwent testing in the Cold Lake area by other companies co-operating with Texaco.

An increasing number of companies — both majors such as Texaco and smaller inde-



pendent companies — have retained the Alberta Research Council to conduct R&D in support of their field pilot studies.

Industrial clients are able to enlist the help of 120 personnel involved in oil sands related research, and also have access to the council's extensive oil sands research facilities in Edmonton, including a fully equipped analytical laboratory.

**— by Elizabeth Page  
Alberta Research Council  
Special to Innovation Supplement**

larger one-metre physical simulator, capable of providing data for the detailed analysis of recovery processes.

As a result of the physical simulator research for Texaco, both a light-hydrocarbon steam and an air-stream process were developed in the laboratory and tested at the Fort McMurray pilot plant.

Solids control — restricting the flow of sand into producing wells — has been a problem during cyclic steam operations at Texaco's pilot project. Texaco contracted the Alberta Research Council to carry out a research project to solve the sand inflow problem which interrupted operations and incurred high maintenance costs.

Scientists made extensive use of a physical simulator specifically designed to evaluate existing sand control techniques, including gravel packing and



# Magnetic Couplings Solve Major Problems for Industry

**I**n the late 1970s, the Nova Scotia Research Foundation Corporation (NSRFC) developed a patented magnetic coupling which has been incorporated into several new products.

Magnetic coupling is a method of transferring torque from a drive motor to a driven fan without a direct mechanical linkage. Torque is transferred by the use of rare earth magnetics attached to the motor drive shaft and to the fan's drive shaft. The magnets are so strong that, even though it is separated from the magnets by a barrier, the fan can be turned at high speeds.

This method of transferring torque eliminates the need of a drive shaft penetrating the bar-

rier between the inner fan and the outer drive motor. Static seals can be used instead of dynamic seals, significantly reducing the possibility of leakage. This innovation is important in the nuclear, chemical and diving industries where maximum separation between inner environment and outer environment is required.

Soon after the development of the coupling and its patenting by Nova Scotia Research, a contract was signed with the Defence and Civil Institute of Environmental Medicine (DCIEM) deep dive facility in Toronto to provide hyperbaric blowers. These blowers move high-pressure breathing gases out of diving chambers through a system of piping to the environ-

mental conditioning system (ECS) and back to the chambers for the divers.

## What is an Environmental Conditioning System?

Divers living in a saturated environment within pressure chambers on large diving systems, such as those used in offshore oil-related construction and production, breathe a mixture of pressurized helium and oxygen. This mixture of gases must be continuously cleaned, dehumidified and temperature controlled on a "closed" basis in order to provide a safe and comfortable environment to the chamber occupants; i.e., they require an "air"-conditioning and life support system that is designed to operate at the chamber pressure.

## Nova Scotia Research Foundation Corporation

**T**he Research Foundation was established in 1946 by the Government of Nova Scotia to assist in the province's economic development. In 1975, a new act changed the name to the Nova Scotia Research Foundation Corporation (NSRFC) with its objective being to "assist in the economic development of Nova Scotia by promoting, stimulating and encouraging the effective utilization of science and technology by industry and government".

This change recognized the industrial orientation of the corporation and the fact that approximately two-thirds of the corporation's income is derived from contract research and development activities.

Under President T. B. Nickerson, five operating divisions — Industrial and Information Services, Engineering Physics and the Centre for Ocean Technology, Geophysics, Chemistry, and Biology — carry out approximately 4 000 assignments each year for 600 companies and government departments. The corporation's activities can be grouped into two approximately equal parts — assistance to industry in the solution of today's technical problems and innovation for tomorrow's opportunities.

While the corporation uses its capabilities to serve all sectors of Nova Scotia's industrial econ-

## *Contract R&D activities important in NSRFC finances.*

omy, particular emphasis is placed on technological support for the secondary manufacturing industry. The corporation continues to emphasize the potential for ocean industry development in Nova Scotia.

Support facilities and services include an instrument shop, glassblowing, marketing, ocean technology production and an extensive scientific and technical library.

## Industrial and Information Services

The Industrial and Information Services Division provides, without charge, technical information and assistance to small manufacturing industries with a view to supplementing and advancing their technological capabilities.

The National Research Council's (NRC) Industrial Research Assistance Program (IRAP) and the Energy Test and Information Centre (ENERTIC) Program of the federal and provincial energy departments play key roles in delivering these services to clients.

The division performs contract work on technical, marketing and research problems.

**Director** — J. R. Helliwell



The system must re-use the same gas continuously to save the cost of expensive helium, remove carbon dioxide, water vapour and other gases in the chamber, add make-up oxygen and control temperature to close tolerances. This is the function of the ECS.

This function can be realized in two ways: the internal ECS and the external ECS. Internal EC systems mount the majority of the equipment within the divers' pressure chambers, utilizing chamber space and relying on the divers to service the equipment within the chamber.

The external ECS is an attractive solution in that it is fully accessible to the technicians outside the chamber, ensuring safety, allowing ease of service, as well as minimizing use of valuable chamber space. Realization of an external ECS requires the ability to couple mechanical power for the gas circulation into

the sealed space of the ECS in an effective and safe manner. NSRFC's patented magnetic coupling meets this requirement.

NSRFC used this technology to develop its hyperbaric blower for DCIEM. The success of the product at DCIEM soon led to similar customers with deep dive facilities who had to move gases at high pressures under zero leakage conditions. NSRFC hyperbaric blowers are now found in the U.S., Norway, West Germany, the United Kingdom, Sweden and on vessels in the North Sea.

These land-based dive facilities generally are used for research activities; however, the bigger market for the hyperbaric blowers is aboard offshore diving vessels and drilling/production rigs in support of hydrocarbon exploration and production.

To respond to this market, NSRFC incorporated its hyperbaric blower into a complete

external environmental conditioning system designed to meet the needs of diving companies operating sophisticated diving vessels in the North Sea and elsewhere. This new product is currently being introduced to the international market.

Over this same time period, contacts were made with the nuclear and chemical industries resulting in the development of additional types of blowers. To take advantage of these opportunities and to fulfill its mandate of technology transfer, Nova Scotia Research set up a separate company, a wholly-owned subsidiary of NSRFC, to market the blowers for the nuclear and chemical markets. Today, blowers manufactured by Nova Magnetics Limited are found in chemical and nuclear facilities around North America.

— **Special to Innovation Supplement**

## **Engineering Physics and the Centre for Ocean Technology**

The electronic and mechanical engineering design skills of this division are used to support and encourage the development of specialized industrial hardware suitable for manufacture in Nova Scotia and competitive in world markets. The Centre for Ocean Technology emphasizes development of ocean hardware.

**Director** — C. R. Tyner

## **Geophysics Division**

The division includes both marine and ground geophysics sections with expertise in field surveys, data interpretation and specialized equipment development. The Deep Towed Sub-Bottom Profiling System developed by the division is used worldwide to examine the engineering properties of the sea floor for offshore pipelines and structures.

**Director** — D. E. T. Bidgood

## **Chemistry Division**

Chemical and chemical engineering research and development and problem-solving for industry and government in Nova Scotia are undertaken by this division in response to existing problems and future opportunities. Process innovation and product improvement related to the utilization of the province's natural resources form a major part of the work of the Chemistry Division.

**Administrator** — J. J. Starzomski

## **Biology Division**

The work of the Biology Division includes development of biological products and processes as well as the provision of biological services to industry and government. The division emphasizes research and development related to fermentation and microbial technology.

**Director** — K. E. Hellenbrand

## **Product Innovation**

Products developed and marketed by NSRFC fall into three categories:

- Sub-bottom profiling systems for offshore engineering studies;
- Electric and fluid rotary connectors for umbilical winches; and
- Magnetically coupled blowers for gas circulation.

All products are commonly found in oil exploration and producing areas.

**Please direct requests for marketing and general information to: J. A. Gillis** — Head of Marketing or

**R. F. MacNeil** — Manager of Administration

## **NOVA SCOTIA RESEARCH FOUNDATION CORPORATION**

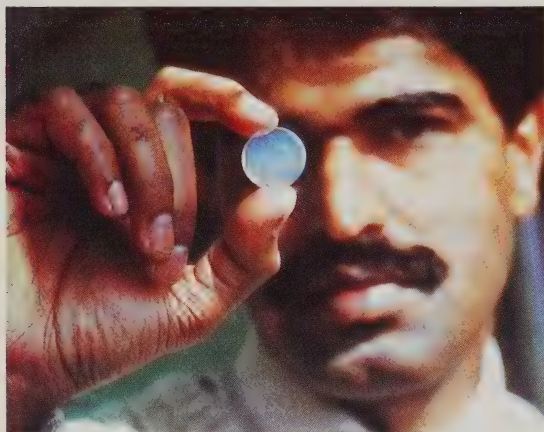
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# Advanced Materials at the Ontario Research Foundation

A

Advanced materials are matters of ongoing research for the Ontario Research Foundation (ORF). They include such subjects as insulations, chemical vapour depositions of tungsten carbide coatings for non-ferrous jobbing foundries, heat mirrors for energy-efficient windows, porous surfaces on metal medical implants and ultra-high-strength concrete.

The materials and programs described here not only allow us a glimpse into the broad spectrum of ORF's capabilities, they also provide an insight into the current priorities of the industries and governments that sponsor these programs.



## Aerogel Insulations

An aerogel is a colloidal gel in which the usual interstitial liquid has been replaced by a dry gas without collapse of the solid matrix. Aerogels open the possibility of very efficiently insulated windows, for the material is transparent in addition to being an efficient thermal barrier.

Other unusual properties may suit aerogels for more exotic uses. The low density, for example, may open opportunities in the aerospace industry, while its unusual (for a solid) refractive index, dielectric constant, porosity and pore size distribution, if combined with adequate mechanical strength, may make it suitable for a broad range of applications yet to be considered.

The material is produced by drying colloidal gels supercritically in an autoclave at 300°C and 2 000 psi over a 24-hour period. The work now being carried out at ORF is designed to improve the production process and reduce the temperature, pressure and the drying time required.

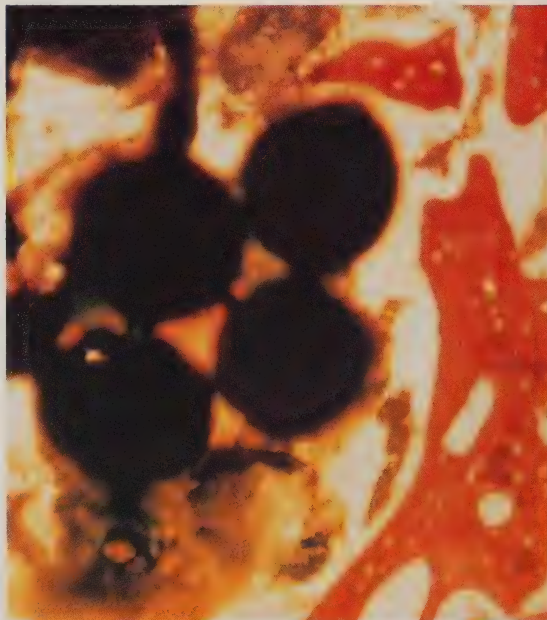
## Porous-Surfaced Metal Implants

Porous surfaces on metal medical implants provide for a firm biological fixation between the implanted device and the body. In joint replacement, they eliminate the need for the poly methyl methacrylate (PMMA) cement employed with smooth-surfaced prostheses.

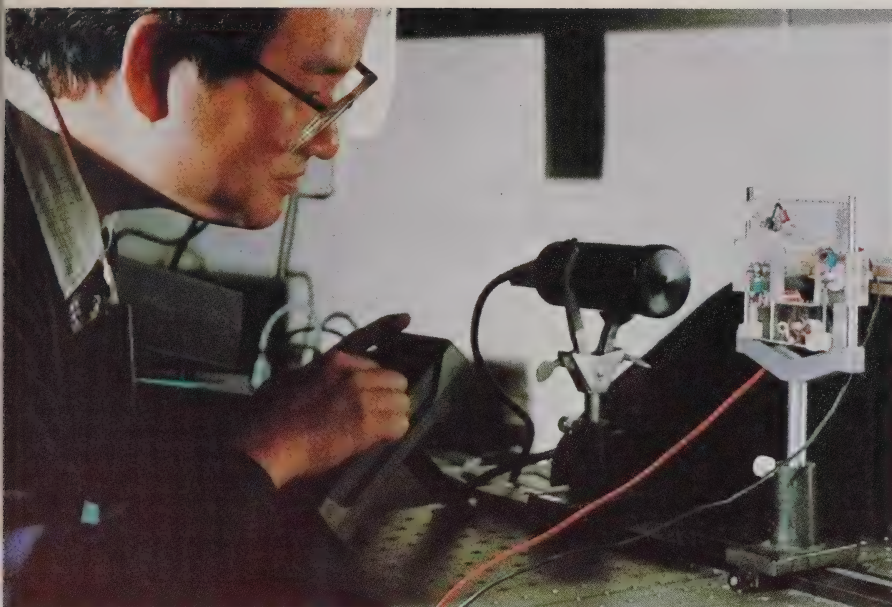
At Ontario Research, fine metal powders are applied to metal surfaces using the binder technique, a process that grew out of many years' experience in the powder metallurgy field. The metal powder, held to the surface by the binder, is sintered at high heat in an oxygen-free atmosphere and passivated by a chemical method to produce an oxide film resistant to body fluids.

For hip implants, the metal porous powder surface provides excellent bonding to cortical bones, with shear strength of about 20 MPa and a tensile strength of about 10 MPa. Although these strength levels are known to be satisfactory for inactive adults, it has yet to be established that they are adequate for active adults.

Powder-coated heartpacer tips anchor positively to the tissue in contrast to uncoated tips, and the formation of scar tissue, which occurs with conventional uncoated tips, is significantly reduced. The intimate contact between tissue and tips also results in improved efficiency of pacer signal transfer.







### Heat Mirror Coatings

Two projects under way in ORF's physics laboratories are concerned with the production of heat mirrors for energy-efficient windows. These devices reflect the near-infrared portion of the spectrum without affecting the visible portion.

One of the programs utilizes films based on titanium nitrides and oxides, which have high visible transmittance and high near-infrared reflectance. The choice of these refractory materials was based on their superior long-term durability and stability.

### Ultra-High-Strength Concrete

Typical of the advanced cementitious materials investigated at Ontario Research is an ultra-high-strength, high-durability and low-permeability concrete. Its special properties are the result of efficient particle packing, careful control of water/cement ratios, and the appropriate use of chemical admixtures. Compressive strength values in excess of 100 MPa are regularly achieved compared to values of 30 to 50 MPa for ordinary structural concrete. Density values are similar to those of standard concrete formulations.

Ultra-high-strength, high-durability and low-permeability concrete is ideal in structural applications where it is necessary to reduce the cross-section of the structural member or the dimensions of steel reinforcement. Its low permeability toward water, salt and other aggressive chemicals makes it suitable for special industrial applications, while its combined properties are expected to give it a unique durability under severe Arctic marine conditions. An indicator of its strength is the fact that, in failure, fracturing commonly occurs through the aggregate, whereas with ordinary concrete, fractures normally occur within the matrix.

The second project involves development of a switchable (dynamic) heat mirror in which the optical properties in the near-infrared range can be varied on demand by means of an electrical excitation. Ideas were borrowed from the field of electrochromic displays to develop a completely solid-state device with poly-WO<sub>3</sub> as the active material. This is in contrast to the sol-gel technology previously described, which has been applied to solid/liquid cells. ORF's task has been to produce films with the correct optical properties.

### Chemical Vapour Deposition

Because of their relatively low cost, graphite moulds are extensively used for short production runs by the non-ferrous jobbing foundries. However, to prevent oxidation of the graphite surface and prolong mould life, casting temperatures have to be kept low, thus reducing the fluidity required for good definition and placing limits on the complexity permitted in mould design.

At ORF a project was undertaken to eliminate the problem of surface oxidation by coating the mould using a chemical vapour deposition (CVD) technique. A small CVD reactor was built especially for the purpose. Graphite moulds of various complexities were then coated with titanium diboride (TiB<sub>2</sub>) produced from gaseous reactants.

The ORF reactor was successful in coating the surface of small graphite moulds which were shown to be superior to conventional uncoated moulds. Thus, the way was opened to manufacture complex non-ferrous mouldings.

**For further information, contact: Ontario Research Foundation, Sheridan Park Research Community, Mississauga, Ontario L5K 1B3.**

# Solving Problems and Turning Ideas into Realities for 58 Years

*In 1978, the Ontario Research Foundation celebrated its 50th birthday. The occasion was low key, and even today there is little knowledge or understanding of how the foundation began, how it is financed, how it is organized and governed, what it does and what its relationship with its clients is.*

**T**he Ontario Research Foundation (ORF) was founded in 1928 with an endowment of \$3 363 050, half of which was donated by industries, business and financial institutions, and half by the Government of Ontario. The first chairman was Sir Joseph Flavelle, who was responsible for raising the original endowment within the business community, and the chosen location was Queen's Park Crescent in Toronto.

From the start, Ontario Research was organized not as a government agency but as an independent, non-profit research facility existing to provide scientific and technical back-up to the industries of Ontario and the rest of Canada. In particular, the organization was designed to serve small and medium-sized companies not large enough to have their own research and development facilities, and to provide special services to larger companies as a complement to their own in-house research resources.

The chief operating officer of Ontario Research is the president, who reports to a board of governors made up of 25 prominent industrialists. The governors, who serve without fee, are appointed for a five-year term by the Lieutenant-Governor of Ontario.

The objectives of Ontario Research have remained unchanged over the years, although operations have changed and expanded to meet the growing requirements of Canadian industry. In 1967, ORF moved to the Sheridan Park Research Community in Missis-



Original building at 47 Queen's Park Crescent, Toronto.

sauga to meet such requirements through expanded facilities.

In order to provide the most comprehensive service possible, Ontario Research has become involved in five broad areas of activity — energy, environment, materials, products and processes, and resources. Such diverse capabilities enable ORF to serve about 85 per cent of the standard industrial classifications found in Canada. Revenues for Ontario Research are expected to be in the \$23-million range in 1985.

Approximately 260 of ORF's 400 employees work within three operating divisions: Environmen-

tal and Chemical Engineering, Materials, and Engineering Sciences. The remainder are assigned to administrative and business development activities. A separate group within the Business Development Division provides industrial and management services specializing in productivity improvement, quality control systems, facilities planning and strategic planning support.

Administrative and operating divisions are housed in 25 641 square metres (276 000 square feet) of space in the main building and two pilot plants at the rear of the property. The buildings, together with parking space and other outdoor faci-



ilities, are situated on ORF's 36-hectare (90-acre) property within the Sheridan Park Research Community.

ORF was a major driving force behind establishment of Mississauga's Sheridan Park, which today houses 14 separate facilities engaged in research, development and related activities.

**T**he diversity of ORF is seen in its ability to tackle problems in a wide range of important fields. They include: engineering; product development; pulp and paper; sewage and effluent treatment; applied microbiology; polymer chemistry; pesticide and trace analysis; organic and inorganic building materials; metallic and non-metallic minerals; physical and process metallurgy; waste utilization; glass and ceramics; pollution monitoring and control; instrument development; computer-aided engineering; electron microscopy; energy applications; advanced materials; and textiles, clothing and footwear.

In its multidisciplinary capability, Ontario Research resembles a large clinic staffed with specialists. No matter how many-sided and complex the problem, ORF can assemble a team of experts to examine and probe it from all directions. At the same time, no problem is too small for the attention of ORF's scientists, engineers and technologists.

Regardless of size, complexity or novelty, all projects and service work are subject to the same strict confidentiality between the sponsor and the Ontario Research Foundation. Likewise, all patents arising out of contract work become the property of the sponsor.

The many capabilities of Ontario Research imply the presence of much sophisticated equipment. The precise answers required by modern industry demand high resolution instrumentation for diagnostic examination, analysis, materials char-

acterization and testing. For example, ORF currently has no fewer than six electron microscopes employed in various ways for materials characterization.

Before commencing work on any R&D program, it is important to know what has been done previously on the subject. Ontario Research has on-line access to more than 800 computerized data bases of bibliographic information and abstracts on subjects ranging from the arts to nuclear physics.

Data bases most frequently consulted by ORF researchers are probably Engineering Index, Chemical Abstracts and the various patent files. The search service and library facilities are also available, on a fee basis, to researchers working outside ORF.

#### **What happens when Ontario Research is approached for help with a technical problem?**

- If the caller does not have the name of an ORF contact, the call will be routed through an information co-ordinator to the most appropriate specialist to handle the enquiry.
- If it is routine service work, a price estimate is given and arrangements made to deliver the samples.
- If the problem is more complex, requiring investigative or development work, arrangements will be made for a meet-



**Dr. H.B. Speakman, first Director of ORF.**

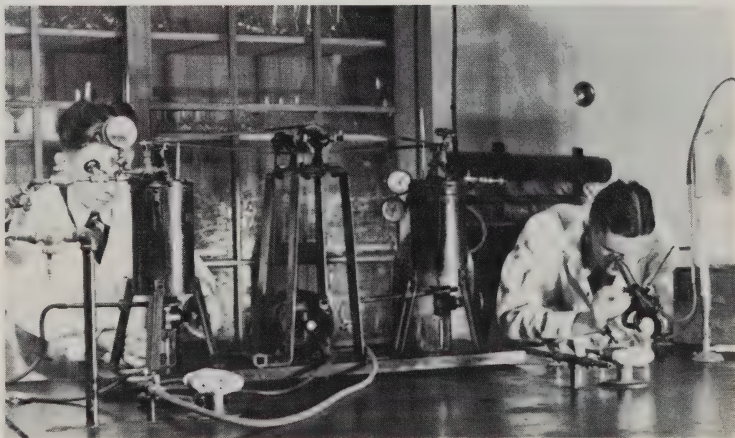
ing that may include experts from several ORF disciplines and others from the client's company.

Such meetings generally result in the decision to prepare a proposal, containing an outline of the work program and an itemized estimate of costs.

Sometimes a client will wish to apply for government funding for the project, and ORF may assist in doing so. Once a contract between the client and ORF is signed, work may begin.

For 58 years people from inside Canada and around the world have been approaching the Ontario Research Foundation with technical problems and ideas. And members of ORF's technical team have sat with them to discuss the problems and methods of approach, and then worked closely with them, quietly solving problems and turning ideas into realities.

**For further information, contact:  
Ontario Research Foundation  
Sheridan Park Research  
Community  
Mississauga, Ontario**



**The hardening of edible oils by hydrogen (March 1937).**

# N.B.'s Research and Productivity Council Promotes Innovation

*Provincial RPC Helps New Brunswick Industry Cope With Changing Demands of the Marketplace And Develop New Processes and Products.*

**N**ew Brunswick formed its provincial research organization in the early 1960s with instructions to help industry and to carry out research and development that could lead to the establishment of new industry.

The Research and Productivity Council (RPC) has its headquarters in Fredericton where there is a building complex of 8 000 square metres for laboratories, engineering shops, pilot plants and administration. Branch offices are being opened elsewhere in the province.

Flexibility of space usage is important and what is office space today might be a laboratory for confidential work tomorrow. Similarly, a pilot plant operation can be turned into a manufacturing enterprise for a brief period until the enterprise is transferred to a commercial locality.

The 120-strong staff, including 60 engineers and scientists and their technical assistants, form teams which emphasize versatility. Staff members are exchanged easily across the three main RPC divisions — engineering, industrial services and science and technology — so that science and technology are applied to the various branches of engineering.

Successful innovation requires a close co-operation between RPC's staff, as the technology developers, and the businesses that will exploit technology as workable products or processes.

The shock troops of the innovative process are the industrial advisors who have a search-and-find mission to industry. They knock on the doors of businesses and visit factories to find out their problems and how RPC can help solve them. It takes time to establish a cordial relationship in which business problems can be

fully discussed, identified and defined and a solution sought.

RPC's activities are closely linked with those of the provincial government and the National Research Council (NRC), particularly those of the NRC field advisory staff. Much innovation has been spurred on with funds from NRC's Industrial Research Assistance Program (IRAP). Some \$800 000 has been spent since 1981 on 150 projects to improve productivity and the technological base of businesses.

Innovation is not without cost. All RPC work is done on a fee-for-service basis through contract or sponsorship. In the 1984-1985 fiscal year, contract revenue, representing more than 90 per cent of all income, exceeded \$7 million. The split between federal and provincial sources and the private sector was about equal.

Partnerships are formed with other consultants and manufacturers to provide the combination

On-site inspection by metallurgical engineers of failed equipment.





*Innovation comes easiest  
from a sponsor with a perceived  
industrial need.*



**Computer-aided machining on the factory floor.**

of strengths and specialties needed to run and execute certain contracts. Clients can also deal directly with subsidiary companies such as Innovent Ltd., which specializes in advanced technology, and Enhanced Recovery Systems Ltd., which commercializes mineral processing innovation.

Although New Brunswick remains the first priority for RPC, work is done elsewhere in Canada and overseas. Although a small part of RPC's work, such activities are tremendously stimulating because they allow staff to match their skills with the best anywhere.

capable of transmitting small diameter sound beams over long distances to improve the detection and sizing of defects in metals.

The end product was the "Axicon" series of conical lenses which give a two-fold increase in depth of focus. Further refinements to a toroidal shape give a four-fold increase. The use of these lenses in ultrasonic inspection to locate previously undetected flaws saves clients millions of dollars each year.

Such technology could also play a vital role in medicine when high resolution images of tissue and organs are required.

There is another route to industrial innovation which starts in the laboratory rather than the factory. A scientific hunch or engineering brain wave is developed and turned into a marketable proposition.

Laboratory work, engineering design, techno-economic analysis, or whatever else is needed, always follows in close consultation with the users and exploiters of the research until technology transfer is complete and the results are used by the client.

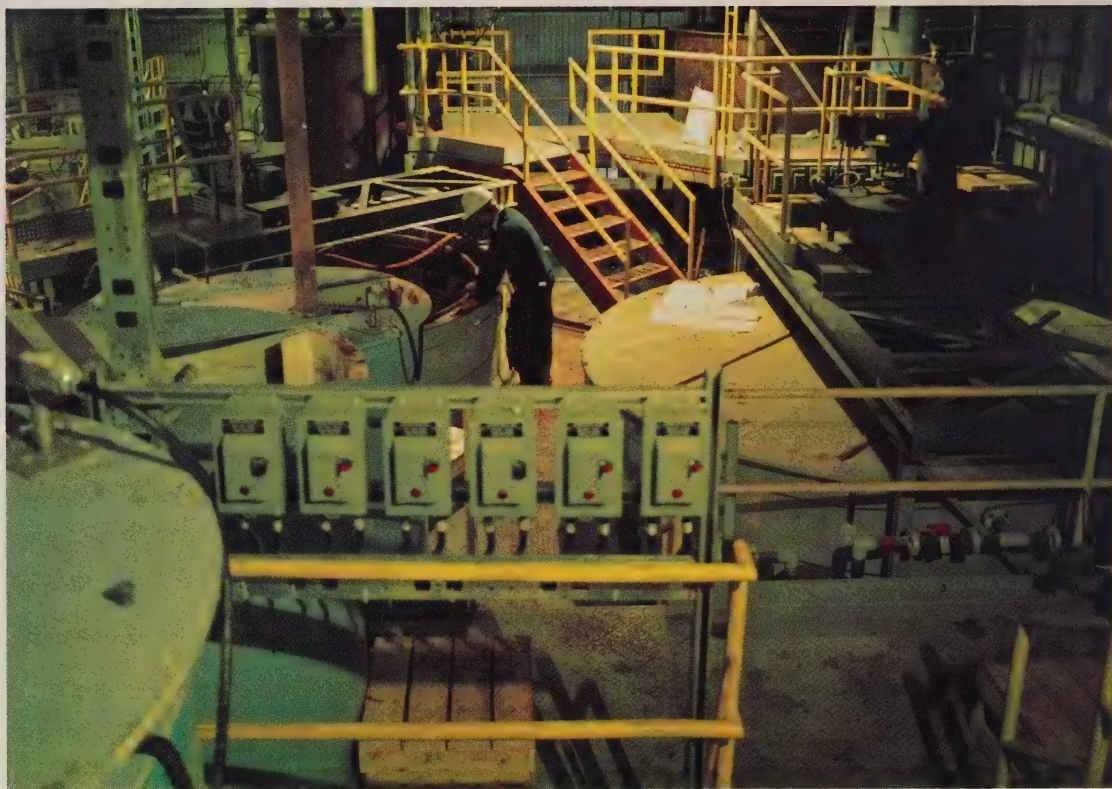
RPC offers clients one-stop shopping for science, technology and engineering. Staff organization is streamlined to help the innovation process through the supply of technical information. RPC staff solve problems and provide quality control, market identification, process and product development, equipment design and manufacturing.

A good example of in-house laboratory work is in the once basic science of mineral processing which has since become a major industrial demonstration project.

**Control valve for roaster feed.**



**I**nnovation comes easiest from a sponsor with a perceived industrial need. Atomic Energy of Canada Limited (AECL) filled this role when it needed better methods of inspection to meet the high standards required for nuclear installations. RPC responded with an ingenious design for an ultrasonic device



The leaching circuit for the extraction of zinc and copper at Enhanced Recovery Systems Ltd.

New Brunswick has zinc-lead-copper deposits from which it is difficult to prepare saleable metal concentrates because it is hard to separate the valuable ore minerals from each other. The sulphation roast leach-electrowining process developed at RPC solves the problem by the use of a pyro- and hydro-metallurgical process that, at comparable cost to other processing, is much more efficient. As a result, metal recoveries are maximized.

The viability of this process is being demonstrated by the RPC subsidiary, Enhanced Recovery Systems Ltd., at Chatham, N.B., with the help of an Economic and Regional Development Agreement (ERDA) grant. The successful application of these process innovations will allow hitherto uneconomical mineral deposits to be exploited and the return on investment could yield a billion dollar bonanza in terms of revenue and job creation.

Patents for the process have been taken out in many countries.

RPC, sensitive to the requirements of clients, has developed areas of excellence in a number of disciplines such as non-destructive testing, physical metallurgy, semio-chemistry and advanced manufacturing technology at its Manufacturing Technology Centre (MTC). The MTC operates a CAD/CAM network with easy access to various provincial terminals to demonstrate and evaluate the latest technologies in manufacturing. Design tasks vary from producing hull designs for fishing craft to that of off-round gears and complex processing equipment.

The CAD/CAM capability allows quick optimization of design, prototype production and testing of innovative ideas generated at RPC and by industrial clients. Technology transfer and acquisition of manufacturing capability necessary for market

penetration are frequently facilitated by financial assistance from the Industrial and Regional Development Program (IRDP) of the Department of Regional Industrial Expansion (DRIE).

A current example is a robotic system for dewiring wire pulp bales at pulper feed stations at pulp and paper mills. Arrangements are being made to build and test a prototype robotic handling system in an Ontario pulp and paper mill. An outcome to these trials will mean that a method of handling the scrap wire can be marketed.

New Brunswick manufacturers will benefit because another innovative commercial venture can be started.

— by D. Abbott  
Manager, Research and Development  
Research and Productivity Council  
Special to the *Innovation Supplement*



# TECHNOLOGY TRANSFERS

## OFFERED

### CANADA

- Interactive Visual Communications System
- Control System for an Optical Modulator
- Production of Purified Porcine Immunoglobulins
- Peak Position Detector
- Masks for a Camera Lens for the Determination of Tridimensional Co-ordinates
- Tension Link for Parachute/Payload Separation
- Remote Identification Device
- Humectants to Preserve Meat Products
- Lithium Battery Protection Circuit
- Computer Controlled Constant Concentration and Size Particulate Aerosol Generation System
- Extraction of Both Carotenoids and Protein from Crustacean Wastes
- Chemorepellant Compound
- Heat Exchanger Core Construction
- Full Support Vehicle Dolly
- Parkguard
- Electronic Cribbage Board
- Printing Pressure-Sensitive Labels
- Portable Multi-Hull Watercraft Kit
- A Device That Controls Stress Naturally

### AUSTRALIA

- Tri-Axle Suspension System
- A Low-Light Miniature Flashlight
- Birefringence Compensation in Polarisation Coupled Lasers
- Airborne Measurement of Optical Scattering Coefficient
- Device and Method for Detecting Antigens and Antibodies
- Aero-Medical Retrieval Unit
- Anti-Ballistic Screens
- Steel Curtain Roll-Up Doors

### BELGIUM

- Plastic Tubes and Pipes

### BRITAIN

- Industrial Pallet Converters

### FRANCE

- Snowshoe-Ski
- Building Construction and Timber Industry
- Sail Catamaran and Power-Driven Outboard All In One

### GERMANY

- Manual Road-Marking Machine
- Electronic Components Containers
- Liquid Crystal Layers Control
- Iron Casting Technology
- Ball Valve for Variable Flow Control
- Heat Exchange System
- Smoke-Gas Heat Exchange System
- Mechanical Drive Device
- Mechanical Foaming Machine

### INDIA

- Foam Polymeric Material

### ITALY

- Internal Combustion Engine

### SWEDEN

- Arrangement in Spring Suspension Systems, Particularly for Vehicles
- Heat Pumping Process Based on the Principle of Absorption

### SWITZERLAND

- Telephone Exchange System
- Universal Experimental System for Digital and Linear Circuits
- Pipe Joining System

### U.S.A.

- Fold-A-Bar
- Variable Bore Ram
- Feedthrough Terminal for High-Power Cell

## REQUESTED

### CANADA

- Method for Object Measurement and Determination
- Advanced Non-Linear Disc Propulsion System
- Advanced Lift and Field Resonance Generation Technology
- Mining Venture

### BELGIUM

(European Communities)

- Off-set Printers
- Packagings
- Cold-Extruded Metal Articles
- Hardened Steel Articles and Tools
- Glass/Resin Fibre
- Asbestos and Mineral-Wool Based Products

### BRITAIN

- Drives, Clutches and Related Products



# OFFERED CANADA

## **Interactive Visual Communications System — 6240**

An interactive visual communications system for maintaining an identical visual picture (picture space) at a number of terminals linked by narrow bandwidth transmission lines. Thus, a number of participants can communicate and use a single picture space without being in physical proximity.

## **Control System for an Optical Modulator — 7417**

A control system for modulating the intensity of a laser so that the modulated component of the output beam is maintained at a constant amplitude. This system was devised for use in transmission spectroscopy.

## **Production of Purified Porcine Immunoglobulins — 7755**

The invention provides a method for the continuous production of a purified porcine immunoglobulin preparation which is employed in the formulation of milk replacers for neonatal pigs. The milk replacers confer passive disease immunity to the piglets and allow them to be raised from birth removed from the sow. Survival rates for piglets can be substantially increased and Specific Pathogen-Free pigs can be raised under practical commercial conditions.

## **Peak Position Detector — 7977**

A detector which will give in real time the position of a peak in a digital input signal to a precision better than one pixel. Detection is achieved by a simple circuit designed for a wide range of signal processing applications.

## **Masks for a Camera Lens for the Determination of Tridimensional Co-ordinates — 7992**

A three-dimensional imaging device of very simple design using essentially an aperture mask and a bidimensional CCD detector. The system is compact and robust and provides very fast operation (within  $\frac{1}{2}$  second) on objects moving at random undetermined speeds. Present performance can reach one per cent of the field of view using a  $100 \times 100$  tridimensional image with real time determination of x, y and z co-ordinates.

## **Tension Link for Parachute/Payload Separation — 8091**

A wholly mechanical device used to link a parachute and its payload together which will affect automatic separation of the payload from the parachute after landing, particularly on water.

## **Remote Identification Device — 8094**

The scattering or reflecting properties of an antenna are used to modulate the radar return from a moveable object in a distinctive manner, thereby permitting identification of the object. This technique requires no radio-frequency power source on the object to be remotely identified.

## **Humectants to Preserve Meat Products — 8145**

This invention involves conveniently manufactured protein hydrolysates for use as humectants in meat and fish products. Problems associated with taste, saltiness or the effects on hypertension of previous humectants are circumvented. The humectants are nutritious, safe, colourless and relatively bland to the palate.

## **Lithium Battery Protection Circuit — 8180**

A device designed to prevent a battery or any one cell of a multicelled battery from undergoing voltage reversals. The device can be integrated and built into the battery pack which makes it cost-effective and well adapted for system design.

## **Computer Controlled Constant Concentration and Size Particulate Aerosol Generation System — 8181**

An aerosol generator for therapeutic inhalation systems designed for dispensing drugs, such as insulin, which are more efficiently utilized when taken through the respiratory system.

## **Extraction of Both Carotenoids and Protein from Crustacean Wastes — 8192**

This invention concerns the extraction, from shrimp or other crustacean wastes, of carotenoproteins which may be used as tissue colourant feed supplements in the rearing of salmon, trout or lobster. These carotenoproteins have better stability and nutritive value than previous products.

## **Chemorepellant Compound — 8224**

The invention concerns a chemorepellant compound for attachment to a prosthetic surface for use in human and animal cardiovascular systems to provide a biocompatible surface with reduced thrombogenicity.

## **For any of the offers listed above, write to: Canada Patents and Development Limited**

275 Slater Street

Ottawa, Ontario

K1A 0R3

Tel: (613) 990-6100

Please quote the appropriate case number.

## **Heat Exchanger Core Construction**

A core construction for a counterflow heat exchanger is disclosed. The core comprises a stack of plates and each plate has lateral rows of corrugations separated by planar areas. The corrugations are angled from the airflow directions, with alternate plates having their corrugations alternately angled. The rows of corrugations in alternate plates bear on each other, defining complex flow passages, and the planar areas face each other, defining plenum areas between rows of complex flow passages. Guide vanes disposed between the plates in inlet and outlet areas assist in distributing airflow laterally across plenum areas adjacent to the ends of the core.

**Write to: Kinetic Systems Inc., 590 Beringer Road, Unit 21, Waterloo, Ontario N2L 6C4.**



### A Device That Controls Stress Naturally

Canadian inventors are offering a Canadian or foreign firm the right to manufacture, market or purchase their invention, ALPHAPLUS, a stress control device. Portable and easy to use, this device is said to help reduce and prevent stress and fight insomnia. The inventors claim that the device is painless, has no side-effects and can be used by the whole family.

**For further information, please contact:**

**ALPHAPLUS**, P.O. Box 8706, Ste-Foy, Quebec G1V 4N6.

### Full Support Vehicle Dolly

This invention covers a highly maneuverable vehicle dolly that provides off-the-ground support to all vehicle wheels at the same time. Its flexibility enables it to accommodate any wheelbase and any wheel spacing. When the dolly is fully inserted under a damaged vehicle, the vehicle can be rolled by hand to a desired shop area.

**Write to: R.A. Woods**, 595 Gorge Road, E., Victoria, British Columbia V8T 2W5.

### Parkguard

A Canadian inventor offers a Canadian company specializing in parking devices, a joint venture or licensing arrangement for the manufacturing and marketing rights for Canada and the United States, of its unique parking obstruction device. It can be used wherever reserved parking is stipulated but not controlled, such as apartment buildings, banks, hospitals, etc.

**Write to: Klaus Hartwing, c/o Kaymar Co.**, P.O. Box 855, Station "K", Toronto, Ontario M4P 2H2; Tel: (416) 484-6939.

### Electronic Cribbage Board

A Canadian inventor offers a Canadian company in the electronics field, under licence, the manufacturing and marketing rights for Canada, for his new invention — an electronic cribbage board. A manual input is also provided so that the board can be used in a variety of other games.

**Write to: Fred Mah, c/o William R. Edgar, Burke-Robertson, Chadwick & Ritchie**, 130 Albert Street, 18th Floor, Ottawa, Ontario K1P 5G4; Tel: (613) 236-9665.

### Printing Pressure-Sensitive Labels

A Canadian firm offers a Canadian company in the printing industry, under licence, the manufacturing in Canada and the marketing and export rights for Canada and the United States, for a printing press developed for printing pressure-sensitive labels in roll form, designed for the short-run label market and the quick-print industry. It is claimed to be easy to operate and maintain.

**Write to: David H. Baldner, Shamrock Label Systems**, 1569 Orange Street, Winnipeg, Manitoba R3E 3B5; Tel: (204) 774-5597; Telex: 07-55189.

### Portable Multi-Hull Watercraft Kit

A portable kit for assembling a multiple-hulled watercraft, such as a catamaran, from two or more open-hulled boats, such as canoes, has been patented. In one embodiment the kit allows the assembly, using two standard canoes, of a stable catamaran with a large deck surface. The multiple-hulled vessel may be assembled or disassembled rapidly using a novel fastening which allows the deck to be tied down with straps or other suitable hardware. In its disassembled state, the kit and hulls can be carried on the roof of a car or van. In its assembled condition, the deck acts to seal the open hulls, creating a stable, water-tight watercraft of large capacity. The deck is constructed to enable the erection of a tent or similar collapsible shelter. It may include a water-tight, protective shroud around the circumference of the tent and, in one variation, a protective tarpaulin above the tent.

**Write to: Victor R. Loffler**, 32851 - 6th Avenue, Mission, British Columbia V2V 1Z2.

## AUSTRALIA

### Tri-Axle Suspension System — 4703-AUA

An Australian firm offers a Canadian company in the automotive/heavy transportation industry, under licence, the manufacturing and marketing rights for Canada for its specially-designed tri-axle suspension system for log-hauling trucks.

**Write to: E.D. McComb, Director, Pentarch International Pty. Ltd.**, 1/224 Wellington Road, Mulgrave, Victoria, Australia 3170.

### A Low-Light Miniature Flashlight\* — 4703-AUA

The Australian government offers a Canadian company the manufacturing and marketing rights, under licence in Canada, for its invention which relates to a throw-away flashlight incorporating as a complete unit batteries and a LED light source and switch, for use in map reading, keyhole lighting, etc.

### Birefringence Compensation in Polarisation Coupled Lasers\* — 4703-AUA

The Australian government offers a Canadian company the manufacturing and marketing rights, under licence in Canada, for its invention which relates to a circular laser rod with optical rotator in which non-uniformities in the beam must be reduced or removed to increase the efficiency of the laser operation.



### **Airborne Measurement of Optical Scattering Coefficient\* — 4703-AUA**

The Australian government offers a Canadian company the manufacturing and marketing rights, under licence in Canada, for its invention which relates to a method of measuring the optical scattering coefficient of the ocean depth when using a scanning laser beam.

### **Device and Method for Detecting Antigens and Antibodies**

A device for use in detecting or determining the presence of antigenic or haptenic substances or antibodies in a sample. It comprises a number of tubular or capillary elements, each having antibodies, antigenic or haptenic substances attached to the internal surface, and a means for causing fluids to pass simultaneously or sequentially through the many capillary elements.

**Write to: Commonwealth Serum Laboratories Commission, 45 Poplar Road, Parkville 3052, Victoria, Australia.**

### **Aero-Medical Retrieval Unit\* — 4703-AUA**

The Australian government offers to a Canadian company the manufacturing and marketing rights, under licence in Canada, for its invention, a dual-action transportable aero-medical unit for treatment and transportation of newborn babies from one locality to another by helicopter, plane or road ambulance. A completely self-contained unit offering full medical facilities to a newborn baby, operating either from available power supply or self-contained batteries. Prototype built and placed into actual hospital use.

For information on the above, marked with an asterisk, **write to: Patents and Licensing Section, Marketing Branch, Office of Defence Production, Department of Defence, Canberra, ACT, 2600, Australia; Tel: (062) 48 2111.**

### **Anti-Ballistic Screens**

An Australian company offers under licence to a Canadian firm the rights to manufacture in Canada its line of "Anti-Ballistic" screens. The Safetell Security Screen system is specially designed to withstand an "Armalite" bullet. Made of thick aluminum, it catches projectiles fired into it. The screens can be lowered or raised within seconds, completely securing an area of at least two metres in height above a teller's station, and can easily fit unobtrusively into any existing decor while offering maximum security.

**Write to: R.C. Coyne, Marketing Manager, Safetell Australia Pty Ltd., 4-6 Somerleigh Road, Laverton North, Victoria 3026, Australia.**

### **Steel Curtain Roll-Up Doors**

A Western Australian company offers under licence or joint-venture arrangements to a Canadian firm, with necessary plant or willing to invest in a plant, the rights to manufacture in Canada its continuous steel curtain roll-up doors for domestic and industrial use.

**Write to: Cleveland Industries Pty Ltd., c/o Senior Trade Commissioner, Australian Trade Commission, P.O. Box 69, Commerce Court Postal Station, Toronto, Ontario M5L 1B9; Tel: (416) 367-0783; Telex: 06219762.**

## **BELGIUM**

(European Communities)

### **Plastic Tubes and Pipes**

Spanish manufacturer of helically-welded, large-diameter pipes, plus replated coatings, wishes to co-operate in joint venture or manufacture under licence with firm manufacturing plastic tubes and pipes (for gas and water services) and/or plastic coatings for metal pipes.

Ref. No: BRE/8578/31

**Write to: Business Co-operation Centre, 6 Rond-Point Schuman, Boite 3, B-1040 Brussels, Belgium.**

## **BRITAIN**

### **Industrial Pallet Converters**

A British firm offers a Canadian company a licence to manufacture and market its "PALLETOWER SYSTEM". The system allows the pallets to be converted into numerous shaped shelves and containers for industrial use.

**For more details contact: Palletower (G.B.) Limited, Orket House, Heyes Lane, Alderley Edge, Cheshire SK9 7LE, England.**

## **FRANCE**

### **Snowshoe-Ski**

A French firm is offering a Canadian polyethylene plastics firm the exclusive rights to manufacture and market in Canada and the United States its snowshoe-ski, used to carry or pull loads across deep snow.

**Write to: Paul Hubert Brunel, Manager, Société SEPCAN, 46, rue Président E. Herriot, 69009 Lyon, France.**

### **Sail Catamaran and Power-Driven Outboard All in One**

A French firm involved in the manufacture of sailboats is looking to enter into a licence agreement with a Canadian company to manufacture the floats and fibreglass pieces used in its power-driven, out-board, the SEA BOB and its sail catamaran the TWIN SURF CATAMARAN. These two boats use the same floats, which may be used separately as sailboards, thanks to a very simple mounting system. The aluminum mounting kit alone is different.

**Write to: R.E.E.L. S.A., 6, rue Hernoux, 21000 Dijon, France.**





### Building Construction and Timber Industry

A French firm is offering a Canadian wood processing or public works and construction firm the right to manufacture and market its Libres Espaces wood-frame house construction system under licence in Canada. This system uses wood, plywood, particle board and insulating techniques allowing two essential functions to be executed in a single operation, namely, the Wall and the Roof.

**Write to: Guy Lemerre, LIBRES ESPACES, Industrial Process Engineering,** 10, rue Sadi-Carnot, 14300 Caen, France.

## GERMANY

### Manual Road-Marking Machine

A West German company offers under licence to a Canadian firm the rights to manufacture in Canada its two-component cold plastic thickline road marking machine which is manually guided and suitable for city and country road marking with minimal disturbance to traffic.

**Write to: Canadian Consulate General,** Esplanade 41, 2000 Hamburg 36, Germany (FRG).



### Electronic Components Containers — Ref: 01

Fully closable container for the storage of electronic circuits (components). The material holding the components is an electrically conductive foam, with an inscribable surface. Allows high-density but clearly organized storage of components, enabling them to be found quickly when needed. For use by software and service departments of computer firms and by amateur electronics enthusiasts.

**Patent pending;** functioning prototype available; ready for mass production. Licence agreement sought.

### Liquid Crystal Layers Control — Ref:03

Circuit for control of liquid crystal layers, allowing the direction of transparency to be adjusted uniformly over the area of a quadrant. Cell degradation is avoided; power consumption is low. For use in windows for buildings, vehicles and aircraft, and in vehicle anti-dazzle rear-view mirror system featuring instantaneous, infinitely variable dimming.

**Patented;** functioning prototype available; ready for mass production. Licence agreement sought.

### Iron Casting Technology — Ref: 04

Process for producing castings made of cast iron with spheroidal graphite with a bainitic/austenitic structure, in such a way that the mechanical properties of this material are largely equivalent to those of low-alloy heat-treatable steels. Advantages are lower component weight and lower production cost, and what in some cases is a very great increase in life. For use in highly stressed crank shafts, railway wheels, and as a substitute for wrought steel, cast steel and components made of case-hardening steels.

**Patented;** ready for mass production. Licence agreement sought.

### Ball Valve for Variable Flow Control — Ref: 06

In connection with the demand for digital flight-control systems, a fast-switching, magnetically operated electrohydraulic 3/2-way ball valve has been developed, with variable flow control achieved by pulse-width modulation. Switching time less than 1 ms. Pressure from 0 to 300 bar. Rigidly constructed and only a few cm in size. Usable for fast and precise microprocessor-driven control of electrohydraulic actuators for all kinds of machinery.

**Patented.** Licence agreement/contract with manufacturers of control for all kinds of machinery.

### Heat Exchange System — Ref: 07

Heat exchange system, working with the latent heat of fusion or solidification. A liquid flows in bubble form through a second liquid which is immiscible with the first and which acts as a heat reservoir. When heat is taken off by the first liquid bubbling through, the second crystallizes at the lower range of the working temperature. When heat is added with the first liquid by means of special nozzles, the crystallized matter liquefies again, after which heat can be taken off as before. The system can be run with low-temperature heat, for instance taking a sodium sulphide solution as the reservoir liquid. For use in heat reservoirs in solar energy systems or other kinds of low-temperature heating systems.

**Patented;** functioning prototype available. Licence agreement/contact with manufacturers of heating apparatus, etc., sought.

### Smoke Gas Heat Exchange System — Ref: 08

Patented system reduces SO<sub>2</sub> emission of central heating installations up to 90 per cent (residues are in dried substance). Available as module for new and, as service kit, for older boilers, it increases efficiency by lowering the smoke gas temperature.

**For the above offers write to:**

**Canadian Embassy, Commercial Division,** Friedrich-Wilhelm-Str. 18, D-5300 Bonn 1.

Please refer to Reference No.

### Mechanical Drive Device

Mechanical drive device with which a moving car wheel can be used to drive tooling, equipment and machinery at power levels of up to 20 hp. This gives a drive potential independent of a fixed power supply. For use in DIY applications, agriculture and disaster emergency services.

**Patented;** functioning prototype available; ready for mass production. Licence agreement/production partner in mechanical engineering industry sought.

**Write to:** Albert Diets, Muhlgaſſe 37 D-6309 Rockenberg 1, Tel: 06033 - 66980.

### Mechanical Foaming Machine

The "Hansa-Mixer" is a mechanical foaming machine for processes such as the coating, finishing, pasting and laminating of flat surfaces in the textile, paper, furniture and building materials industries. It is suitable for use throughout the food industry (except the water/sugar/glucose sector) and in particular in the mass-production baking industry. Future use in the waste water industry is also planned. Used instead of fluidics for foam production, the machine can reduce material costs, energy costs and waste water, and give a superior end product.

**Patented;** ready for mass production. Sales and distribution agreement sought.

**Write to:** Hansa Industrie-Mixer GmbH & Co. KG, Kronsbruch 6-8, D-2805 Stuhr 1/Heiligenrode, Tel: 04206-9084/9086, Telex: 24609 him / Germany (attn: Herr Kupfer/Herr Kerl).

## INDIA

### Foam Polymeric Material

An inventor from Calcutta, India, offers a Canadian company in the field of polyurethane chemistry, under licence, the manufacturing in Canada and marketing and export rights for Canada and the United States, for his process for manufacturing foam polymeric material from carbonaceous waste. It is claimed that the product has excellent dimensional stability and does not expand when subjected to weathering. It is less expensive than conventional foam, odour-free and can be made totally non-flammable. Its quick setting and excellent compressibility makes the product suitable for the construction industry.

**Write to:** Santanu Roy, c/o

**Dr. James R. Keneford, Herridge, Tolmie,**  
50 O'Connor Street, Suite 1400, Ottawa, Ontario  
K1P 6L2; Tel: (613) 235-7234; Telex: 053-3323.

## ITALY

### Internal Combustion Engine

This internal combustion engine performs the thermodynamic cycle partially inside the cylinder, with the piston connected to the crankshaft, and partially in a turbo-supercharger. The final stage of the expansion of the burnt gases and, simultaneously, the suction and the first phase of compression of the air takes place in the turbo-charger. The compression is completed in the cylinder, continuously and without any partialization.

**Write to:** Guidoboni,  
Laerte, Italy.

## SWEDEN

### Arrangement in Spring Suspension Systems, Particularly for Vehicles

An arrangement in spring suspension systems, particularly for vehicles, for allowing movements with most or all degrees of freedom between two bodies and with a frequency range of from 1-5 000 Hz. The arrangement comprises at least one spring member mounted between the bodies and formed with a rigid cylindrical outer surface axially of which the spring member is resiliently deformable. The spring member is connected laterally between its ends with one of the bodies by a supplemental elastomeric spring. The supplemental spring means surrounding the cylindrical outer surface of the spring member so as to allow resilient universal tilting movements of the spring member from a centre position, while the spring member is connected with the other body by an articulated end on the spring member.

**Write to:** Mining Transportation Co. AB, Box 99, S-981 22 Kiruna, Sweden.

### Heat Pumping Process Based on the Principle of Absorption

Phosphoric acid, especially orthophosphoric acid, is employed as the absorption medium in an absorption heat pumping system using water as its working medium. The acid may contain additions of corrosion inhibitors and/or boiling point elevating agents if desired.

**Write to:** Scandiaconsult AB, 7, Kapellgrad, S-116 21, Stockholm, Sweden.

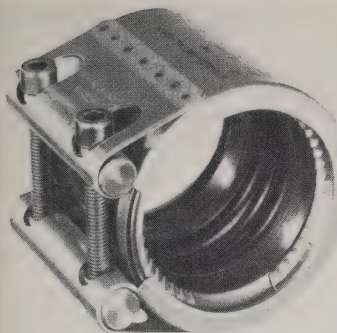
## SWITZERLAND

### Telephone Exchange System

A Swiss firm is offering Canadian companies, through a joint-venture arrangement, technology related to its "Telephone Exchange TELITCH". This is claimed to be one of the most modern telephone exchanges for connections on local battery as well as telex connections and transmission of data. It is fully electrical and cordless with very simple handling. This system could be used for military purposes, civil defence and civil communication.

**Write to:** Indigel AG, Schaffhauserstrasse 34, CH-8450 Andelfingen/Switzerland.





### Pipe Joining System

European producer seeks Canadian partner for distribution and technical support, as well as for production after a successful introduction phase, of its new pipe-joining system, employing new technology already proven in world markets. This unique patented device couples or repairs pipes from 3.8 cm (1½ in.) to 198 cm (78 in.) diameter better, faster, more easily and more economically than traditional methods. Eliminates costly treatment of pipe ends (welding, threading, grooving, bordering, etc.). Partner should have a well-developed program in piping components, valves, pumps, etc., and good connections to all potential users.

**Write to: "COUPLING", Kurt M. Frey, Commercial Officer, Canadian Embassy, Kirchenfeldstrasse 88, CH-3005 Berne, Switzerland; Tel: (41-31) 44-63-81.**

### Universal Experimental System for Digital and Linear Circuits

A Swiss firm is offering Canadian companies, through a joint-venture arrangement, technology related to its "Experimental Board TP". The latter is specially suitable for high-quality digital, microprocessor and analogue controls. Most important characteristics: due to screening, highest work frequency to 10 MHz is possible; connections without soldering with high elastic cables; 3 x 8 LED-lamps for indication of static control state, involved generator and network equipment. Digital and analogue controls are possible at the same time. Large accessory of adapters.

**Write to: Indigel AG, Schaffhauserstrasse 34, CH-8450 Andelfingen/Switzerland.**

## U.S.A.

### Fold-A-Bar

An American inventor offers a Canadian company in the leisure products industry, under licence, the manufacturing in Canada and the marketing and export rights for Canada and other countries for his invention, a Fold-A-Bar which carries everything to a party site in one hand. Included are an ice bucket, refreshments and glasses with built-in holder. It won't tip or spill, folds compactly for easy storage and is perfect for patio, pool, deck, boat, picnics or parties.

**Write to: David B. Ruber, Ever-Wear, Inc., 7817 Luna, Morton Grove, Illinois 60053.**

### Variable Bore Ram

A blowout preventer and a seal are patented for sealing about pipes or other objects in a well bore. The seal element is a semi-circular section of resilient, compressible material having a semi-circular inner surface to engage the pipe-embedded radially disposed support elements. These have anti-extrusion members which serve in combination with overlapping ram block members to prevent extrusion of the resilient material from the top and bottom of the seal. The top and bottom members are stair stepped and have interlocking fingers and recesses and are adapted to slide radially and circumferentially. Flanges on the seal element are provided with top and bottom plates each of which overlaps at least one support element.

**Write to: Hydriil Company, 714 West Olympic Boulevard, Los Angeles, California 90015.**

### Feedthrough Terminal for High-Power Cell

A feedthrough terminal has been patented for a high-power electrochemical storage cell which provides low resistance coupling to the conductive elements therein, while isolating the terminal electrode from the highly corrosive environment within the cell. A large diameter, cylindrical copper electrode is enclosed in a stainless steel tube with a BN power feedthrough seal maintained around the stainless steel tube by means of facing insulative bushings and an outer sleeve. One end of the copper conductor is silverbrazed directly to a flat, "butterfly" bus bar within the cell, with the adjacent end of the surrounding outer feedthrough sleeve welded to the bus bar.

**Write to: United States Department of Energy, Washington, DC 20585.**



# REQUESTED

## CANADA

### Method for Object Measurement and Determination

A Canadian inventor seeks suitable licensing or joint-venture arrangements with a Canadian company interested in the further development of a patent pending method for object measurement and determination. The dimensions and other characteristics of an object are measured as it slides freely past a special arrangement of sensors and electronics. The method has specific application in coin validation equipment as well as in other fields requiring the measurement of moving objects.

**Write to: J.R. MacDonald, P.Eng., Antares Electronics Engineering, P.O. Box 11204, Stn. H, Nepean, Ontario K2H 7T9; Tel: (613) 825-6259.**

### Advanced Non-Linear Disc Propulsion System

An Ontario company is developing (after successfully testing an earlier concept/working prototype) an advanced non-linear disc propulsion system. It seeks joint-venture/equity funding to further develop the second generation system which is now 70 per cent complete. This new high technology disc system, weighing approximately 90 kilograms (200 pounds), has been computer modelled to project 900 kilograms (2 000 pounds) of thrust which is industrially applicable to the defence/aerospace/marine industries for use in mini/shuttle orbital vehicles, satellite orbital adjustment systems, and marine vessel applications. This advanced propulsion system uses magnesium discs, electro-mechanical electro-magnetic pulse generators, infrared sensors, and advanced state-of-the-art solid-state electronics with a continual accelerating capability.

### Advanced Lift and Field Resonance Generation Technology

An Ontario company is developing an advanced second generation model of an advanced lift and field resonance system that vertically and horizontally displaces, molecularly disintegrates and/or laterally shreds into micro-ribbons specimens of aluminum, steel, copper, ceramics and wood. This technology uses advanced electronics, field generators, applies components of Nikola Tesla, and uses an additional combination and application of frequency modulation to create an envelope of field resonance surrounding and through metal specimens. Seeking joint-venture/equity funding/manufacturer participation to further develop system and to develop a production prototype for defence, aerospace and industrial development applications.

**For more details on these two ventures, write to: T.A. McNally, Advanced Technologies Canada, Inc., 32nd Floor, Toronto Dominion Bank Tower, Box 65, Toronto-Dominion Centre, Toronto, Ontario M5K 1E7; Tel: (416) 836-1000.**

### Mining Venture

A Canadian corporation is looking for a successful Canadian mining operation willing to form a joint-venture.

**If interested, please contact J.A. Wright, Bellechasse Mining Corporation Ltd., P.O. Box 24517, Houston, Texas 77013, U.S.A.; Tel: (713) 672-6647.**

## BELGIUM

(European Communities)

### Off-Set Printers

Danish off-set printers seek co-operation partner for exchange of research and know-how or working under licence.

Ref. No.: BRF/8520/47

### Packagings

Swedish plastic injection moulder of packagings seeks a partner for manufacturing and marketing of packagings with a unique in-mould decoration.

Ref. No.: BRE/8665/48

### Cold-Extruded Metal Articles

Spanish manufacturer of cold-extruded metal articles seeks partner manufacturing cold or semi-hot extruded metal articles and making automated tools and equipment for exchange of technology and know-how.

Ref. No.: BRE/8579/31

### Hardened Steel Articles and Tools

Spanish manufacturer of hardened steel articles and tools (drills and milling heads) seeks partner for exchange of technology and know-how.

Ref. No.: BRE/8580/31

### Glass/Resin Fibre

Spanish manufacturer of laminated sheet, compression mouldings, tubes (filament winding) and (hand-up) contact mouldings for automated electrical and thermal machinery seeks partner, manufacturing glass/resin fibre based electrical insulators, for joint product development and exchange of technology.

Ref. No.: BRE/8582/31

### Asbestos and Mineral-Wool Based Products

Spanish manufacturer of asbestos and mineral-wool based insulating and sealing products and asbestos clothing and equipment seeks partner engaged in the same activity for exchange of technology and know-how and development of substitute products.

Ref. No.: BRE/8584/24

### For More Information on these and other requests please write to:

#### Business Co-operation Centre

6 Rond-Point Schuman

Boite 3

P-1040 Brussels, Belgium

Please indicate Reference No.

## BRITAIN

### Drives, Clutches and Related Products

British firm involved in power transmission drives is looking for appropriate Canadian technology to diversify its product line.

**For more information please contact: I. Bier & Son (Overseas) Ltd., Kemp House, 152/160 City Road, London EC1V 2PE, England; Tel: 01253-6173.**

# SPECIAL EVENTS

## CANADA

- First Workshop on Operational Meteorology/ Winnipeg-February 1986

## GERMANY

- Hanover Fair/Hanover-April 1986

## CANADA

- Petroleum Industry's Annual Safety Seminar/ Banff-April 1986
- Colloquium IV/Lake Louise-April 1986
- EXPO '86 / 1986 World Exposition/Vancouver-May-October 1986

## U.S.A.

- TechEx '86 AMERICAS/Orlando-May 1986

## CANADA

- World Congress on Education and Technology/Vancouver-May 1986
- Twentieth Annual CMOS Congress/Canadian Hydrology Symposium: 86/Regina-June 1986
- 1986 National Petroleum Show/Calgary-June 1986
- Renewable Energies '86/Winnipeg-June 1986

## U.S.A.

- 1986 Process and Materials Quality Conference/Atlanta-September 1986

## FRANCE

- 13th Congress of the World Energy Conference/Cannes-October 1986

## CANADA

- 1986 International Printing and Graphic Arts Conference/Ottawa-October 1986

## CZECHOSLOVAKIA

- INVEX '86 / 9th International Exhibition of Inventions and Novel Features/Brno-October 1986

## ITALY

- TechEx '86 Europa/Milan-November 1986

## CANADA

- Annual Transit Trade Show/Windsor-November 1986

## GERMANY

- Technologieforum Berlin/Berlin-November 1986

## BELGIUM

- Eureka 35th World Inventions Exhibition/ Brussels-December 1986

## FINLAND

- Pulp Washing '87/Mariehamn-May 1987





# SPECIAL EVENTS

## First Workshop on Operational Meteorology

Winnipeg, Manitoba

February 4-6, 1986

The First Workshop on Operational Meteorology, sponsored by the Atmospheric Environment Service of Environment Canada and the Canadian Meteorological and Oceanographic Society, will be held February 4-6, 1986 in Winnipeg, Manitoba.

**For additional information concerning the meeting, please write to:**

**Program Chairman, Louis Legal**  
18 Alburg Drive  
Winnipeg, Manitoba  
R2N 1L9  
Tel: (204) 949-2071

## Hanover Fair

Hall 7, Hanover Fairgrounds,  
Hanover, West Germany

April 9-16, 1986

**Contact: Mr. Wiegmann**

**Deutsche Messe und Ausstellungen AG**

Messelaende, D-3000, Hanover 82  
West Germany  
Tel: 0511-89-2735  
Telex: 992728

## Petroleum Industry's 35th Annual Safety Seminar

Banff Park Lodge

Banff, Alberta

April 30 - May 2, 1986

Main topic of discussion will be critical sour gas wells and public safety.

**For additional information on the special event, please write to: Safety Seminar**

**CANADIAN PETROLEUM ASSOCIATION**

1500, 633 - Sixth Avenue S.W.  
Calgary, Alberta  
T2P 2Y5  
Tel: (403) 269-6721

## Colloquium IV

Château Lake Louise

Banff National Park, Alberta

April 21 - 25, 1986

The Canadian Hydrographers' Association and the Canadian Petroleum Association are pleased to invite you to a jointly sponsored CHA Workshop and CPA Conference to discuss today's survey challenges, land, sea and space.

**For additional information on the CHA-CPA meeting, please write to: Diana Parnell**

**CANADIAN PETROLEUM ASSOCIATION**

1500, 633 - Sixth Avenue S.W.  
Calgary, Alberta  
T2P 2Y5  
Tel: (403) 269-6721

## EXPO '86

1986 WORLD EXPOSITION

Vancouver, British Columbia

Canada

May 2 - October 13, 1986

**For more information, write to:**

**EXPO Information**

P.O. Box 1800, Station "A"  
Vancouver, British Columbia  
Canada  
V6L 3A2  
Tel: (604) 660-3976

## The 21st Event at a New Location

**TechEx '86 Americas**

EXPO CENTRE

500 West Livingston Street

Orlando, Florida 32801 U.S.A.

May 20 - 23, 1986

TechEx is the largest international fair that deals with new products and technology available for licence. Exhibitors include members of industry and governments, universities and delegates from all major areas where technology is available.

**For additional information on the fair, please write to:**

**Canadian Agent**

**J.L. Ekebrecht**

**Lomar Associates**

1384 Tyandaga Park Drive  
Burlington, Ontario  
L7P 1N3

Tel: (416) 632-3863

Telex: (FELL-FAB) 061-8673

or

**Dr. Dvorkovitz & Associates**

P.O. Box 1748

Ormond Beach, Florida 32075-1748  
U.S.A.

Tel: (904) 677-7033

Telex: 810-832-6299

## World Congress on Education and Technology

Vancouver, British Columbia

May 22 - 25, 1986

It will be the first major conference of its kind to address the impact of new technology on training, education, culture and society in general.

**Titles of the seven themes are:**

- Teaching, Learning and Technology
- Management and Technology
- Training and Employment
- The Future Society
- Innovations
- Special Needs and Technology
- Policy and Planning

**For additional information on this international event, please write to:**

**World Congress on Education and Technology**

1155 West 8th Avenue  
Vancouver, British Columbia  
V6H 1C5  
Tel: (604) 734-2721

## Twentieth Annual CMOS Congress/Canadian Hydrology Symposium:86

University of Regina

Regina, Saskatchewan

June 3 - 6, 1986

**For additional information on the CMOS Congress/CHS:86, please write to:**

**K.H. Jones**

**CMOS / CHS:86**

**Environment Canada**

P.O. Box 4080

Regina, Saskatchewan

S4P 3W5

## 1986 National Petroleum Show

CANADA'S 10th INTERNATIONAL MARKETPLACE FOR THE WORLD'S ENERGY INDUSTRIES

Stampede Park

Calgary, Alberta

June 10 - 12, 1986

Canada's largest energy show is held biennially in Calgary, the centre of Canada's oil and gas industry. The show attracts the top specifying and purchasing agents throughout the industry from Canada, the United States and abroad.

**For additional information on the energy show, please write to your nearest representative:**

**Eastern Canada**

**Joyce Parsons, Show Manager**

**The National Petroleum Show**

1450 Don Mills Road

Don Mills, Ontario

M3B 2X7

Tel: (416) 445-6641

Telex: 06-966612



**Western Canada  
Ward Brawrow, Show Co-ordinator  
The National Petroleum Show**  
Suite 200  
1201 - 5th Street S.W.  
Calgary, Alberta  
T2R 1L1  
Tel: (403) 269-3161  
Telex: 03-822845

**Renewable Energies '86**  
University of Manitoba Campus  
Winnipeg, Manitoba  
June 22 - 25, 1986  
**For additional information on the  
conference, please write to:**  
**Renewable Energies '86**  
P.O. Box 1256  
Winnipeg, Manitoba  
R3C 2Y4

**1986 Process and Materials  
Quality Conference**  
Waverly Hotel  
Atlanta, Georgia  
September 21 - 24, 1986  
The conference, which is co-  
sponsored by the Technical Sec-  
tion, CPPA, TAPPI and SPCI, will pro-  
vide an international forum for dis-  
semination of information relating  
to methods, techniques and instru-  
mentation useful in quality evalua-  
tion of materials, processes and  
products of the pulp, paper and  
related industries.  
**For additional information on the  
conference, please write to:**  
**David Paterson**  
**Technical Section, CPPA**  
**Sun Life Building**  
1155 Metcalfe Street, 23rd Floor  
Montreal, Quebec  
H2B 2X9  
Tel: (514) 866-6621  
Telex: 055-60690

**13th Congress of the World  
Energy Conference**  
Palais des Congrès  
Cannes, France  
October 5 - 11, 1986  
An exhibition will be held at the  
Palais des Congrès throughout the  
Congress. Its theme will be:  
"Energy: Current and Future  
Technology".  
**For further information, contact:**  
**Dr. C.H. Smith, General Manager**  
**Canadian National Committee**  
**World Energy Conference**  
Suite 305  
130 Albert Street, Ottawa, Ontario  
K1P 5G4  
Tel: (613) 993-4624  
Telex: 053.3117

**1986 International Printing and  
Graphic Arts Conference**  
Château Laurier Hotel  
Ottawa, Ontario  
October 21 - 23, 1986  
The conference, which is co-  
sponsored by the Technical Sec-  
tion, CPPA and TAPPI, will focus  
on the role of paper in printing of  
the future and will concentrate on  
the challenge of keeping up with  
rapidly evolving printing and  
imaging processes and their  
demands on paper requirements.  
**For additional information on the  
conference, please write to:**  
**David H. Paterson**  
**Technical Section, CPPA**  
**Sun Life Building**  
1155 Metcalfe Street, 23rd Floor  
Montreal, Quebec  
H3B 2X9  
Tel: (514) 866-6621  
Telex: 055-60690

**INVEX '86 9th International  
Exhibition of Inventions and  
Novel Features**  
Fair Grounds  
Brno, Czechoslovakia  
October 22 - 28, 1986  
**Contact:**  
**Zdenek PLCH, Manager**  
**Brno Trade Fairs and Exhibitions**  
**Vystaviste**  
602 00 Brno, Czechoslovakia  
Tel: 314-2942  
Telex: 062-294

**TechEx '86 Europa**  
Milan Fair  
Milan, Italy  
November 4 - 7, 1986  
TechEx is the largest international  
fair that deals with new products  
and technology available for  
licence. Exhibitors include members  
of industry and government, uni-  
versities and delegates from all  
major areas where technology is  
available.  
**For additional information on the  
fair, please write to:**  
**Canadian Agent,**  
**J.L. Eckebrecht**  
**Lomar Associates**  
1384 Tyandaga Park Drive  
Burlington, Ontario L7P 1N3  
Tel: (416) 632-3863  
Telex: (FELL-FAB) 061-8673  
or  
**Dr. Dvorkovitz & Associates**  
P.O. Box 1748  
Ormond Beach, Florida 32075-1748  
U.S.A.  
Tel: (904) 677-7033  
Telex: 810-832-62299

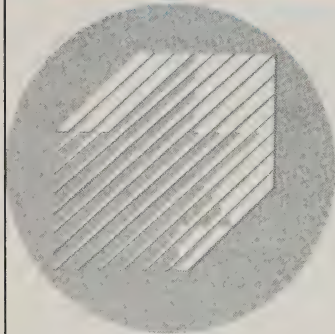
**Annual Transit Trade Show**  
Hilton Hotel  
Windsor, Ontario  
November 17, 1986  
**For additional information on the  
special event, please write to:**  
**Mrs. C. Graefner, Manager of**  
**Administration**  
**Canadian Urban Transit**  
**Association**  
Suite 1101, 55 York Street  
Toronto, Ontario M5J 1R7  
Tel: (416) 365-9800

**Technologieforum Berlin**  
**International Innovation Market**  
**Exhibition and Congress**  
Berlin, West Germany  
November 25 - 28, 1986  
**For additional information on the  
fair, please write to:**  
**AMK Berlin**  
**Ausstellungs-Messe-Kongress GmbH**  
Messedamm 22  
D-1000 Berlin 19

**Eureka 35th World Inventions  
Exhibition**  
Expo Rogier Centre  
Brussels, Belgium  
December 1986  
**Contact:**  
**Secretariat**  
**Sogestor S.A.**  
Rue Duquesnoy 14  
1000 Brussels, Belgium  
Tel: 02/512.21.87 - 513.16.07  
Telex: 62052 sofair

**Pulp Washing '87**  
**An International Symposium on**  
**the Fundamentals and Practice of**  
**Pulp Washing**  
Hotel Arkipelag  
Mariehamn, Åland, Finland  
May 19 - 21, 1987  
**For additional information on the  
Symposium, please write to:**  
**David H. Paterson**  
**Technical Section, CPPA**  
**Sun Life Building**  
1155 Metcalfe Street, 23rd Floor  
Montreal, Quebec  
H3B 2X9  
Tel: (514) 866-6621  
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### 5. INVENTION

Outstanding advance in a  
process or product technology.

### 6. TECHNOLOGY TRANSFER

Outstanding achievement in the  
identification, transfer,  
adaptation and commercial  
exploitation of technology.

### 7. INNOVATION

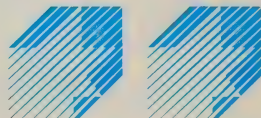
Outstanding achievement in the  
innovative application of a  
technology to products, pro-  
cesses or services.

### 8. INDUSTRIAL DESIGN

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Government  
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The Honourable SINCLAIR STEVENS, Minister





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C.P. 247  
Montréal (Québec)  
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Tel: (514) 283-8185

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T5J 3S3  
Tel: (403) 420-2944

### **Local Office:**

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Tel: (604) 661-0434

### **Local Offices:**

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108 Lambert Street  
Whitehorse, Yukon  
Y1A 1Z2  
Tel: (403) 668-4655

## **Northwest Territories**

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Precambrian Building  
Yellowknife, Northwest Territories  
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# INNOVATION

Supplement to Canada Commerce

Fall 1986

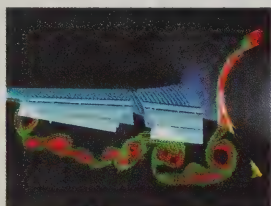


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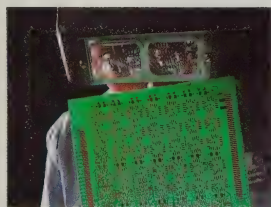
### 2 de Havilland and Boeing

Boeing Corporation of Seattle's purchase of de Havilland marks the start of a new era in Canada's aerospace industry.



### 6 Technical Expertise on Tap

Boeing Technology Services can provide Canadian companies with one of the largest private research facilities in the world.



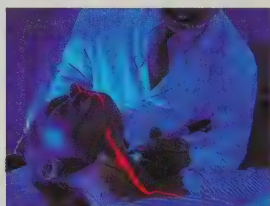
### 8 Canadian Marconi Company

This wireless pioneer still leads in its fields of high-technology communications.



### 10 Why Automate?

Four major trends are forcing companies to adopt advanced manufacturing technologies.



### 11 The Search for New Life-Care Products

This Toronto firm, Bios Inc., helps biomedical firms find innovative new products.



### 12 Auto-Asyst

New key to meet the productivity challenge in systems development.

### 14 Technology Transfers

### 20 Special Events

## Innovation Supplement

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad. Ideas for articles and information, even finished articles, will be welcomed.

We invite you to become a part of the *Innovation Supplement* with your comments and ideas. You can contact us at:

## Innovation Supplement

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Office of Industrial Innovation,  
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Expansion, 235 Queen Street, Ottawa,  
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## Photo credits

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Hon. Michel Côté  
Minister of Regional Industrial Expansion  
Hon. Bernard Valcourt  
Minister of State (Small Businesses and Tourism)





**E**ARLY this year, Boeing Commercial Airplane Company of Seattle, Washington, and the Government of Canada signed an agreement whereby the shares of government-owned de Havilland Aircraft of Canada Limited were sold to Boeing. Each in its own way had much to offer the other. de Havilland is one of Canada's largest aeronautical firms and a world leader in the development and manufacture of short take-off and landing (STOL) and commuter aircraft. Boeing is one of the world's largest and most successful suppliers of commercial and military aircraft and services.

As a result of the sale, on the one hand, Boeing has fleshed out its product line and, on the other, de Havilland has gained the financial clout and worldwide sales and technical network of Boeing. De Havilland will continue to develop and produce its STOL and small commuter planes on a world mandating basis, thus giving the best assurance of continuing employment to Canadian workers. In fact, a portent of the future is that, since the sale, de Havilland has announced the largest sales ever of its new Dash-8 commuter planes.

As outlined in this issue of *Innovation*, with its greater stake in Canada, Boeing will be more amenable to sharing its world-class technology and private testing and R&D facilities with Canadian suppliers and others.

The story on BIOS Ltd. outlines how this new firm keeps its customers supplied with the latest developments in biotechnology and how it arranges for technology transfer and joint venture partners to be brought together in this rapidly growing field.

Rounding out this issue devoted to successful high-tech firms is the story on Canadian Marconi Company, the pioneer in the development of radio and a world leader in the design and development of specialized radio, radar and navigational equipment.

The National Research Council has announced the establishment of a Space Division to consolidate the management of Canada's continuing space research program. Under the policy guidance of the Ministry of State for Science and Technology, the new Space Division will be responsible for:

- Canada's contribution to the NASA Space Station;
- A user-development program for the development of Canadian industrial capabilities for space-based manufacturing;
- The Canadian Astronaut Program; and
- The space science research program previously co-ordinated by NRC's Canada Centre for Space Science.

The Space Division provides an increased measure of effectiveness in co-ordinating NRC's continuing space research efforts through such organizations as the Mobile Servicing Centre (MSC) and the User-Development Program Office.

The Mobile Servicing Centre will focus on a new generation of robotics technology and control systems. MSC will be a key element in construction of the space station and maintenance of the station, its instruments and other payloads. The space station is scheduled to be operational by 1994 barring any further space set-backs.

The User-Development Program Office will work with Canadian industries and government and university laboratories to identify and develop areas in which Canadians can exploit the commercial and research potential of space.

When NASA space shuttle flights are rescheduled, Canadian astronaut Steve MacLean will fly on the second Canadian mission in space, focused on a computerized Space Vision System developed by NRC. The space science program encompasses efforts in the fields of microgravity, space physics and upper-atmosphere research.

# de Havilland & Boeing

## N a t u r a l P a r t n e r s

**I**N keeping with the federal government's intention to return to the private sector those Crown companies that no longer are required to ensure policy commitments, de Havilland Aircraft of Canada Limited was sold to Boeing Company of Seattle, Washington, early this year.

The sale has provided de Havilland and its workers with the most positive assurance of continuation, not only of employment but also the ability to remain in the forefront of its field through the promise of a world mandate in research and development of short take-off and landing (STOL) and commuter aircraft for Boeing Commercial Airplane Company.

Through the years since its establishment in Canada in 1928, Canada's oldest and most experienced aircraft manufacturer, de Havilland, has evolved into a fully integrated entity based at Downsview, northwest of Toronto. It now boasts over 200 000 square metres of production, design and office space and employs 4500 people.

### 4000 Aircraft

Since 1946, when the company designed its first wholly Canadian aircraft, de Havilland has built and delivered close to 4000 aircraft for use in more than 90 countries around the world.

De Havilland's Canadian-designed products include:

- the DHC-1 Chipmunk (216 built in Canada, 1600 built under licence in Europe);
- the DHC-2 Beaver (1631 produced);
- the DHC-3 Otter (466 produced);
- the DHC-4 Caribou (307 produced);
- the DHC-2 MKIII Turbo Beaver (60 produced);
- the DHC-5 Buffalo (120 produced);
- the DHC-6 Twin Otter (830 produced);
- the DHC-7 Dash-7 (107 produced);
- the DHC-8 Dash-8 (13 delivered to date and a full order book of over 40).

From the mid-1940s, through the next 25 years, de Havilland specialized in military and bush aircraft. Since the late 1960s, as the demand for military aircraft declined, the company responded to the demands of small commercial airline and charter operators with its current stable of commuter air-

craft: the 19-passenger Twin Otter, 36-passenger Dash-8 and 50-passenger Dash-7.

As well as having its own work force, de Havilland currently does business with close to 1100 suppliers and sub-contractors from coast to coast in Canada.

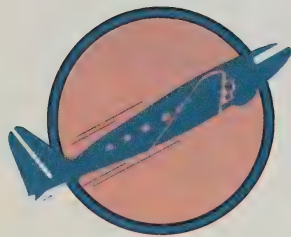
To illustrate the employment potential of continuing sales to Canada, each Twin Otter represents 32.9 person-years of work, 165.6 for the Dash-7, and 112.7 for the Dash-8 at the company's facilities. And for every 100 jobs at Downsview, 70 others are created elsewhere in Canada.

### Long History in Canada

While Boeing is an American-controlled company, it has had a long history in Canada. There are probably few Canadians who have flown to any great extent who, at one time or another, have not boarded one or the other of Boeing's fleet of commercial aircraft since the Boeing 727-200 entered into service in 1967.

This family of commercial jets includes the 737s, the 757s, the 767s and the 747s — the fleet's largest, carrying from 450 to 500 passengers up to 9800 kilometres (6100 miles).

In addition to de Havilland, Boeing has three other divisions in Canada, one each in Vancouver, Winnipeg and Arnprior, Ontario. Other Boeing personnel work in five cities providing field service support to Canadian airlines that operate Boeing jetliners. In all, these Boeing facilities employ over 1000 persons in highly skilled occupations tied to the leading edge of technology.







The Dash-8 is the latest in a long line of specialty aircraft designed and manufactured by de Havilland for Canadian and world markets.

The CITIZEN, OTTAWA • WEDNESDAY, SEPTEMBER 10, 1986

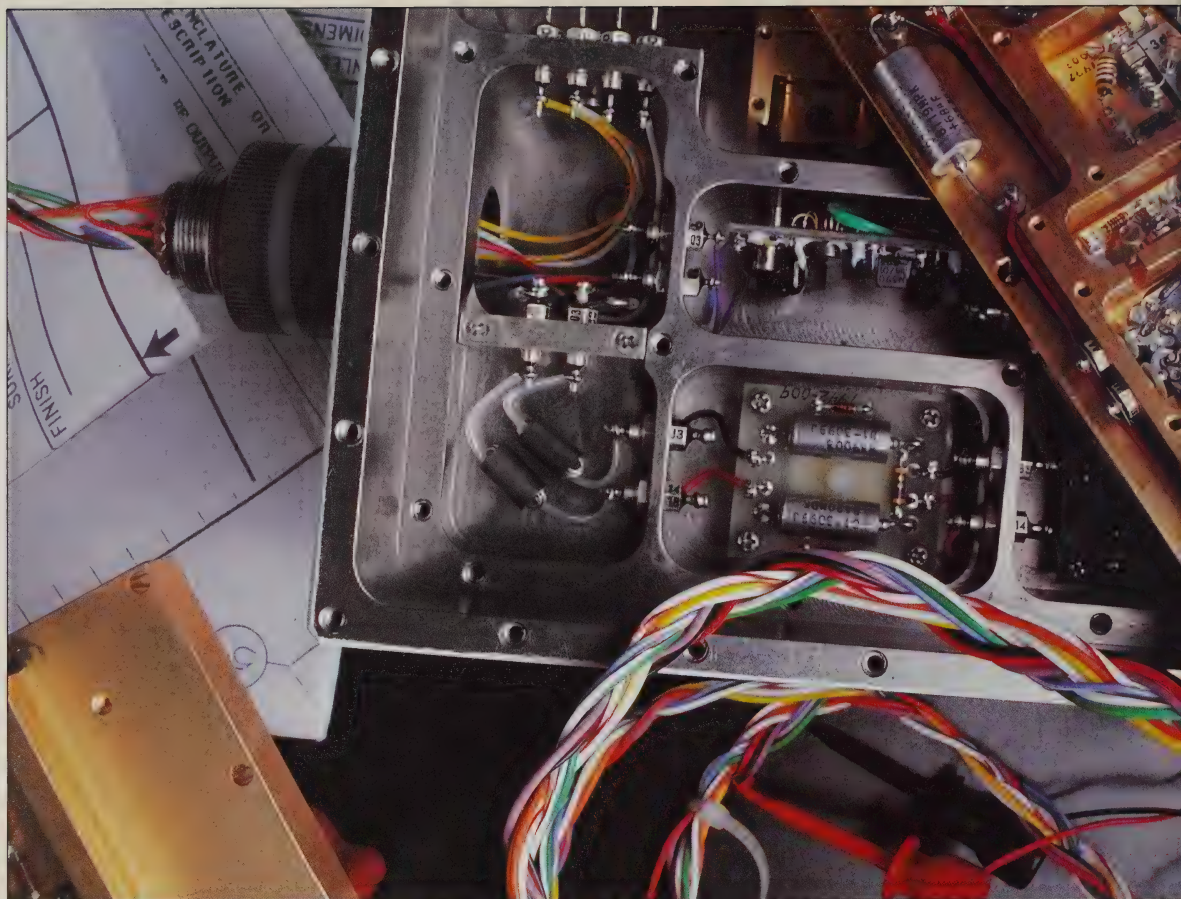
## De Havilland lands record aircraft order

By Paul Koring  
Southern News

FARNBOROUGH, England — Canada's de Havilland Aircraft Co. won its biggest-ever aircraft order Tuesday — the sale of six Dash 8 commuter aircraft to Henson Aviation, of Salisbury, Md.

Henson also took 18 options on the Dash 8, including six which may be applied to the larger, and yet to fly, Dash 8-300 which will seat 50 passengers compared to the 36 seats in the Dash 8-100.

If Henson takes up all its options, the deal worth \$155 million and will give the company, which feeds Piedmont Airlines, a total of 30 Dash 8 aircraft.



Boeing plays a substantial role as a buyer of parts and services for incorporation into products that the company markets worldwide.

But Boeing's Canadian business involvement goes beyond its own facilities. Not only is it a supplier to Canadian firms and the Canadian government (160 jet transports delivered to air carriers and the Canadian Armed Forces, 21 helicopters for DND units), Boeing also plays a substantial role as a buyer of parts and services for incorporation into products that the company markets worldwide.

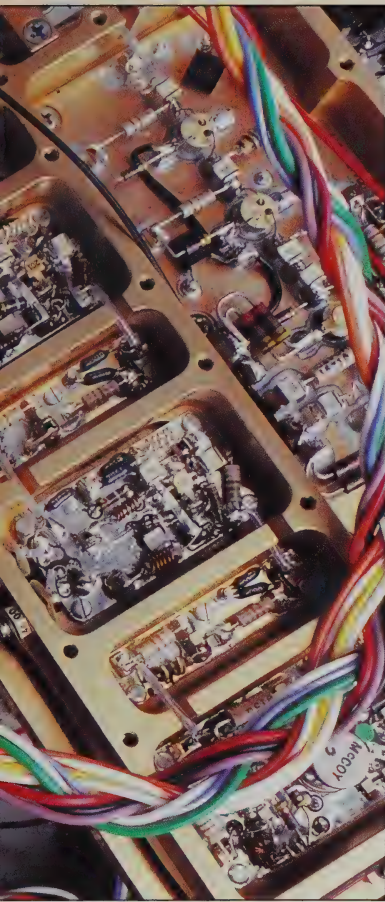
In the past six years, for instance, Boeing has placed \$768 million in orders with companies in seven Canadian provinces. And recently, the company promised to inject a further \$11 million annually into the Canadian economy with the announcement that its Winnipeg Division would become exclusive supplier of 24-metre-long, wing-to-body fairings for the 747 superjet.

This contract alone will create a further 250 jobs throughout Canada and is a direct result of the Boeing purchase of de Havilland.

All this is in addition to a \$25 million package of new investments designed to upgrade de Havilland's capability to produce high technology composite material components for its own aircraft.

Prior to the de Havilland takeover, Canada was Boeing's fourth largest procurement source, but this is sure to change with this new inter-relationship and Canada is expected to catch up with some of the top three — the United Kingdom, Italy and Japan.





### Connection Dates Back 66 Years

Boeing's connection with Canada is not a recent phenomenon. It dates back 66 years to the time when aviation was in its infancy, just 15 years after the Wright brothers' first powered flight. Because of the proximity of the two nations, it was natural that some of the first international aviation flights in the western hemisphere should be between Seattle, the home town of Boeing, and Vancouver and Victoria in British Columbia.

The first North American international airmail flight was carried out on March 3, 1919, from Vancouver to Seattle aboard a Boeing Model C biplane. The aircraft took off from Coal Harbour, B.C., carrying William E. Boeing, founder of the company, and his pilot, Eddie Hubbard, plus one mail bag. A 55-minute fuel stop at Edmonds, 19 km north of Seattle, made it an even three hours between the two cities, slow time by today's standards but faster than steamship or railroad of the time.

The following year, the pilot of the Vancouver-Seattle flight began the first U.S. international contract airmail service using a Boeing B-1 flying boat. But it wasn't until 1929 that Boeing arrived in Canada as a business entity.

In May of that year, Boeing Aircraft of Canada came into being when the company acquired the assets of Hoffer-Beeching Shipyards Ltd. of

Vancouver, the largest builder of pleasure boats on the Pacific Coast.

In the early 1930s, such diverse aircraft were built there as Seattle-designed Boeing Model 204 flying boats — Canadian designation "Thunderbird"; the Canadian-designed Boeing "Totem" flying boat; Boeing "Steel-truss" gliders; and Boeing Model 40 mail planes also designed in Seattle.

However, the Great Depression's pall lowered over Boeing Aircraft of Canada's airplane building operations. It was not until 1937 that aircraft construction was again added to boat and shipbuilding and aircraft overhaul and repair. A modern plant was built at Sea Island Airport, present site of Vancouver's international airport.

The first product was the British-designed Blackburn "Shark" torpedo aircraft for the Royal Canadian Air Force, of which 17 were built as the war clouds gathered.

### Wartime Production

With the coming of World War II, activity at Boeing Aircraft of Canada increased.

- Thousands of wing spars for Avro-Anson twin engine reconnaissance and training aircraft were fabricated.
- About 2000 tail surfaces were constructed for de Havilland "Mosquito" bombers and fighters.
- There were 307 Consolidated "Catalina" flying boats and amphibians built, as well as important subassemblies for Boeing B-29 bombers.
- Overhaul and repair work on RCAF aircraft was also carried out.

Peak wartime employment in the three Vancouver-area plants reached 10 275.

With the war over, the Sea Island plant was sold and, in 1953, Boeing Aircraft of Canada was dissolved as a Boeing subsidiary.

In 1960, Boeing reappeared in Canada as Boeing of Canada Ltd. Its forerunner was Piasecki Helicopter of Canada, established in May 1953 for repair and overhaul of helicopters sold to the Canadian government. It became Canadian Vertol Aircraft Ltd. and in 1960, following acquisition by Boeing of Vertol Aircraft Ltd., a helicopter manufacturing company, it became Boeing of Canada Ltd. (BCL).

### Arnprior Division

Situated in Arnprior, Ontario, some 80 km west of Ottawa, the Arnprior Division of BCL continues to provide overhaul and repair service for Canadian Armed Forces helicopters and, in addition, manufactures precision parts for helicopters and fixed-wing aircraft, with almost 50 percent of the product marketed outside Canada.

Current business at the Arnprior Division is keeping 345 highly skilled employees occupied in making helicopter blade lag-dampers and other high-precision parts for the aircraft industry.

Division facilities are now being upgraded under a five-year, \$10-million program designed to keep pace with advances in technology and to maintain and improve productivity. The division is now pursuing a U.S. Navy qualification program in order to secure additional navy business.

### Winnipeg Division

A decade after Boeing's reappearance on the Cana-

dian business scene, a joint announcement by the Government of Canada and Boeing revealed plans to build new facilities in Winnipeg. In 1971, the Winnipeg Division began operations in a new \$3.5-million plant staffed by 57 employees. By 1973, employment had risen to 300, producing high strength-to-weight-ratio fibre composite plastic components for aircraft, spacecraft and other advanced technology applications.

The division has the engineering, manufacturing and development expertise to design and build solid laminate or sandwich panel components. Glass, high-modulus graphite and organic fibres, and thermosetting resin systems are used.

The division produces both structural and non-structural glass fibre and advanced fibre composite components for a diversified range of products from aircraft to satellites. It is currently working with the Department of National Defence (DND) on the development of new-generation aerial targets to satisfy training requirements associated with state-of-the-art defence weapons now in use. These target systems offer world market potential.

Sales for the most recent fiscal year were \$27.2 million, of which the greatest portion was contributed by aerospace products. The manufacturing facilities total 14 700 m<sup>2</sup> on a 51-ha site adjacent to Winnipeg International Airport, plus an additional 10 000 m<sup>2</sup> of nearby leased space. Current employment is 637.

An intensive research and development program, along with increased tool design and fabrication capability, is aimed at establishing the Winnipeg Division as a primary composites manufacturing organization within Boeing, and a Canadian leader in the field.

### BCS Canada

In 1974, Boeing acquired Tennant, Song and Associates Ltd. which, as Boeing Computer Services of Canada Ltd. (BCS), markets a full range of computer services from its headquarters in Vancouver and offices in Calgary and Toronto. BCS Canada's customers include government departments and agencies, large companies in the private sector and, in Calgary, some major oil companies.

According to its Canadian president Norman Sung, BCS Canada, like other Boeing establishments in Canada, enjoys the benefits of "being a component of a large, successful, well-managed, leading-edge, multinational corporation, along with the prestige which this association implies."

### Natural Partners

While Canada and de Havilland have benefited, and will continue to benefit, from the international sales and financial clout of its new parent, Boeing, in turn, will benefit from de Havilland's acknowledged leadership in STOL and commuter aircraft, a niche not previously filled by the parent company.

All in all, Boeing and de Havilland seem to be "natural partners" in the highly competitive international market for commercial and military aircraft and in retaining for Canada niches in the broader fields of high technology.

**Editor's Note:** See the following story about another Boeing service that could prove beneficial to a wide range of Canadian companies.



# Boeing Technology Services

# Technical Expertise on Tap

**C**ANADIAN suppliers and industries have gained an important plus in the higher profile of Boeing Technology Services (BTS) in Canada, one result of the recent purchase of de Havilland Aircraft of Canada Limited by Boeing Company of Seattle, Washington.

While primarily established to provide Boeing companies with research and development and testing facilities for leading-edge technology in the aircraft business, Boeing Technology Services has developed into one of the largest and most progressive private research facilities in the world.

BTS is one of two subsidiaries of the Boeing Corporation involved in marketing corporate technology. Patents or products created as offshoots of the corporation's aeronautical business are sold via Boeing Associated Products Ltd.

BTS operates as a consulting operation with responsibility for technical services in problem resolution. While BTS provides revenue from services rendered, it is also considered a generator of goodwill in supporting aircraft sales and certifying suppliers, both directly and indirectly. According to C. Scott Church, president of Boeing Technology Services International, an offshoot of BTS, it is this that has interested senior management in selling corporate services, particularly if advanced technology is involved.

Thus, with Boeing's increasing presence in Canada, it is more than likely that increased efforts will be made to promote and sell BTS services to both its suppliers and other Canadian industries.

The company has had several contracts in Canada, most notably in working with Canadair on the Challenger's nose gear, with Pratt & Whitney on a flying test bed which allowed engines to be tested on aircraft, and in the provision of laser measuring tech-



nology to MacMillan Bloedel Ltd. for one of its sawmills.

Church emphasized that BTS is prepared to certify new Canadian suppliers to Boeing. They will be placed on Boeing's approved suppliers list and invited to bid on tenders. Boeing certification is recognized by aeronautical firms throughout the world.

But, BTS goes far beyond both certification and the aeronautical field.

BTS can authenticate a Rembrandt, find a few metal particles in a truck load of ground beef or determine whether a siren and top light will blow off a police car. More than 1000 different customers have asked for solutions to these and many more mundane problems since BTS was organized in 1972.

BTS contracts with companies or individuals (and they need have no relation to the aerospace industry) to solve their problems by finding the right experts in the right discipline at Boeing.

"You don't have to be an aerospace conglomerate to come to us," Scott Church emphasizes. "We have provided cost-effective solutions for jobs as small as a \$500 materials testing request. Of course, we have also helped with multi-million-dollar manufacturing programs."

**Boeing solved a problem of extreme temperature changes for the space telescope by developing a lightweight, durable, graphite-epoxy material able to support three tons of instruments during launch or re-entry.**

Many of its aerospace customers, such as NASA, Pratt & Whitney, Canadair and Martin Marietta, come to BTS routinely, but the customer list also includes Ford Motor Company, General Motors, Weyerhaeuser and the U.S. Coast Guard. However, most of the customers are smaller, specialized firms.

"Most people aren't aware of all the varied resources Boeing must maintain to produce its high-technology jetliners, space vehicles and electronic systems," Church says.

Some of these are:

- the largest privately owned wind tunnel complex;
- state-of-the-art material testing facilities;
- centres for research into environmental, noise, propulsion, structures and manufacturing problems;
- special software for inspection systems, CAD/CAM programs and software development consultation.

Most of the contracts require the use of Boeing's Materials Laboratory which contains more than \$50 million worth of inspection and testing equipment for materials qualification and analysis. It was in this laboratory that the Rembrandt was authenticated. Currently, the lab is heavily involved in composite development.

The Boeing Aerodynamic Laboratory is not only physically the largest privately owned wind tunnel complex, but it also provides the support facilities, personnel and expertise necessary to design and run specialized tests. Normally these tunnels are filled with aircraft models, but they have been used to test other pressure-sensitive items.

Tunnels available include test sections from 10 cm by 10 cm to 2.4 m by 3.6 m, speeds from 80 to almost 40 000 km per hour and run times from 20 seconds to continuous. From these alternatives, tests can be tailored to meet almost any conceivable requirement or budget. It was here that a local law



enforcement agency tested a new cartop light and siren design.

The Boeing Acoustical Laboratory is also among the most advanced in the world. Primarily used to reduce engine and aerodynamic noise for jetliners, it can be used to perform tests and aid in design analysis and vibration control on virtually any noise-sensitive product. Community and industrial noise surveys are other areas of Boeing expertise.

Almost anything and everything can be tested by Boeing's environmental test resources. These have checked out a Boeing 747's communication system, an icebreaker propeller and the effects of fire and smoke. Atmospheric chambers and hydraulic and mechanical labs are just some of the facilities.

A relatively new business for BTS is the sale of application software developed within Boeing Commercial Airplane Co. According to BTS marketing manager, David Richardson, "Our programs, developed in the Flight Simulation Lab, can be a tremendous benefit to the aviation industry, covering fields from crew training, avionics design and integration to weather and environmental modelling."

Church says, "We find it rewarding to help others solve technical problems that might otherwise go

unsolved because of lack of resources or expertise.

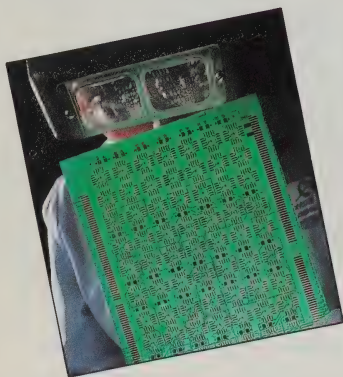
"But sale of our technology also benefits us. Not only does it provide revenue, but we gain experience and knowledge from solving problems in non-related industries. Also, it lets us exercise our skills during times of low design and development activity in-house."

*For more information, contact:* David R. Richardson, Marketing Manager, Boeing Technology Services, Box 3707 (M.S. 9R-28), Seattle, WA 98124, U.S.A., Telephone: (206) 237-4490.

**Boeing wind tunnels are available to test a wide range of aerodynamic capabilities. Many problems can be solved through computer-based simulation without the added expense of modelling.**



# Canadian Marconi Company



**A leadless chip carrier board (LCC) printed circuit board at one of many inspection stages.**

**E**VEN after more than 80 years in the communications business, Canadian Marconi Company (CMC) still maintains its pioneering spirit in the highly competitive and innovative fields of high-technology electronics and communications.

The company was founded in 1903 by Guglielmo Marconi, the genius who engineered and received the first trans-Atlantic wireless signal at Signal Hill, outside St. John's, Newfoundland, in December 1901.

From its roots in maritime wireless communication, broadcasting (CFCF-Montréal was one of the world's first commercial radio stations) and consumer market radio and television, the company has developed into one of the world's foremost manufacturers of high-tech electronics and communications equipment.

General product categories encompass avionics, tactical communications radar, specialized electronic components and telex systems.

CMC's operations are divided into two major management groups. The Communications Group includes the Defence Communications and Special Services Divisions; the Electronics Group comprises the Avionics, Components, DataComm Products and Radar Divisions.

Marconi's wholly owned U.S. subsidiary, CMC Electronics Inc., complements CMC's activities in product development, sales and systems support.

CMC is a publicly held Canadian corporation, with The General Electric Company p.l.c. of Great Britain holding 51.6 percent of outstanding shares.

Since 1903, the company's executive offices and main manufacturing facilities have been located in Montréal. In 1982, a second facility was established in Kanata, Ontario, and now houses the Radar and DataComm Products Divisions, and selected avionics engineering and development programs. Also based

at Kanata is the production of ground-based navigation equipment, such as microwave and instrument landing systems.

The defence agencies of some 20 countries rely on CMC's military avionics products.

The CMA-730 line of opto-electronic engine instruments has set a standard for the aerospace industry and their performance has led the U.S. military to select them for the Mohawk, Apache, Seahawk, Ahip and Blackhawk helicopter programs. A new version, using LED crystal display (LCD) technology, is also available.

Some 5000 CMC Doppler radar navigation systems are in use around the world. CMC's global positioning system receivers, which will receive transmissions from the U.S. Air Force's Navstar satellite constellation, have recently been introduced. A newly developed airborne MLS receiver, exceeding U.S. military requirements for the equipment, is now in production. CMC has received a contract to develop and manufacture the operator's display console for the Trinity gun system manufactured by Bofors Ordnance of Sweden.

CMC has designed command, control and communications systems for various countries around the world. CMC's AN/GRC-103 line-of-sight radio is the most widely used in the western world, with 14 000 sold to date. The new CMR-104 is a compact digital UHF multi-channel radio for tactical environments.

The company's AN/TRC-180 radio terminal set, a communications shelter containing three radio/cable/multiplex stacks, has been delivered to the U.S. Army for evaluation. Recently, CMC signed a contract with GTE for the provision of tactical radios for the multimillion-dollar MSE contract.

Major international corporations, including the top 10 North American aerospace manufacturers, specify

# Wireless Pioneer Still Leads in High-Technology Communications

CMC components for their avionics, defence communications, airborne early warning and guidance systems, and other strategic equipment.

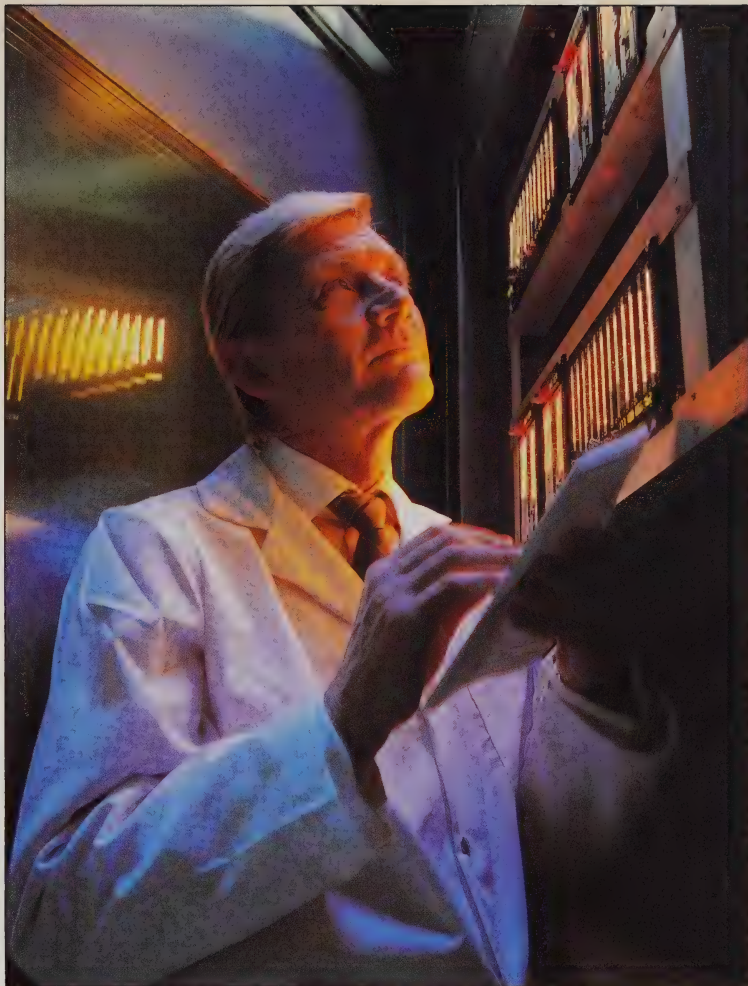
CMC's customized printed circuit boards, hybrid microcircuits, illuminated panels, night vision goggle (NVG) compatible displays, power supplies and machined parts form the core of many high reliability systems. Hazeltine Corp. has ordered CMC power supplies for its MLS ground stations destined for U.S. airports.

CMC's AN/SPS-503 medium-range surveillance radar was developed for the Canadian Destroyer Life Extension (DELEX) program, and is available for adaptation to various craft. The company's LN-66 surface search radar is in use on most U.S. military ships, from river patrol craft to aircraft carriers. Current R&D activities encompass a C-band radar and a range of products associated with the AN/SPS-503.

CMC's DataComm Products Division developed the CMA-755 telex and low-speed data exchanges for the upgrading of Britain's inland telex network. The \$50-million contract, calling for the installation of some 60 000 telex line terminations in 10 British cities, was the largest ever awarded in the field. All the exchanges are now in service, and a series of expansions at the Keybridge exchange in London is under way.

The Special Services Division is involved in specialized work for customers such as the Canadian Department of National Defence, including repair, calibration, equipment installation and testing for the CF-18 fighter aircraft, as well as repair and overhaul of airborne radar and navigation aids.

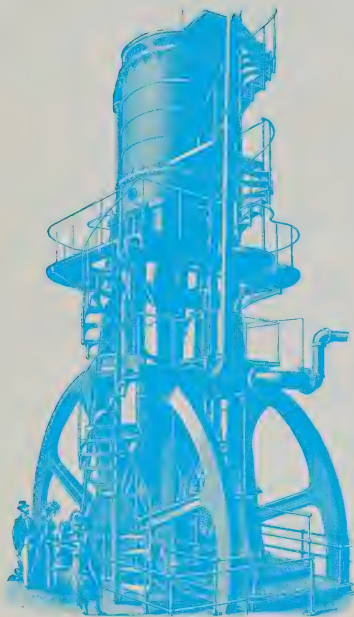
For further information, contact: Canadian Marconi Company, 2442 Trenton Ave., Montréal, Quebec, H3P 1Y9, Telephone: (514) 341-7630.



**A complete helicopter engine instrument system is about to undergo repetitive temperature cycling to detect weaknesses in components or fabrication before delivery to the customer.**



# Why Automate?



**F**AR too many companies are still viewing automation as a means for labour content reduction. This is a rather myopic view, satisfying no one and upsetting many.

In the recently published report *Factories of the Future: Defining the Target* of the U.S. National Science Foundation, four major trends were identified in the advanced manufacturing industries.

The first major trend is a push for speed. The total manufacturing cycle from design through delivery must be reduced by an order of magnitude — not an incremental improvement, but rather a qualitative jump.

The pressure to eliminate all unnecessary delays is motivated not only by the desire to provide better service to customers, but also by a need for better control and cost reduction. For example, capital equipment items, which on an average take six to 12 months to make in Canada or the U.S., take six to 12 weeks to make in Japan.

The second major trend is the need for flexibility. The range of the manufacturing systems and all hardware and software must be greatly extended in order to accommodate the variations that will become accepted as normal.

Equipment must be versatile so that its cost can be amortized over many different products. The time and effort in set-ups must be reduced to the point where they are not a factor in costs; very small batch sizes can then be economic.

Average set-up time in metal stamping industries in North America, for instance, is somewhere between two and 12 hours, depending on the size of the dies. Many Japanese firms do this in two to 12 minutes. Again, the difference is not incremental — it is one of an order of magnitude.

The third large trend is the transition to more machine intelligence. The entire manufacturing system must escape from its current reliance upon human interpretation or individual judgement, starting with management of the enormous quantities of data that organizations deal with and gradually moving past data into information, and from information into knowledge.

It will not be sufficient to capture human expertise in expert systems, because the intuitive methods of people (while often surprisingly effective) are too prone to error, too slow and arbitrary to provide a basis for good control of tightly coupled, complex and fast-moving systems.

Finally, the integration of technologies is crucial.

Advances in narrow, highly specialized fields of research will only be wasted if bottlenecks at the interfaces impede productivity. No organization will be able to gain the full benefit of known technologies unless they fit together in an elegant, graceful way.

Furthermore, the kind of integration that will produce the greatest benefit in the future is not a "paste-together" band-aid kind, but rather a well planned "rebuild-from-common-foundation" kind.

The difficulty of getting individuals and companies to pay serious attention to issues of integration should not be underestimated, for it is a reversal of a historical trend towards segmentation and specialization.

Manufacturing is a complex system. For many years it has been run as a large system with many human beings fine-tuning it with mountains of paper.

Some case studies showed that 30 to 50 pieces of paper were needed to move one part through the manufacturing process. The development of each piece of paper, with the corresponding data or information contained on it, represented cost, time and possibility of error. It represented communication problems.

So long as competition and new technologies did not disturb this complex system, it was just a matter of fine-tuning the existing system in order to be competitive.

Management paid attention mainly to bottlenecks or fire-fighting. There was no need for a long-term view as to where the company was and where it was going. To make matters worse, manufacturing for many years was considered a "second class citizen". To work in manufacturing was not considered very prestigious.

This changed almost overnight. On the one hand, competition is pushing us into faster, more accurate and less costly ways of doing things, while improving quality at the same time.

On the other hand, new technologies, such as computer and microprocessor technologies, are allowing us to do all of these and other things we only dreamt about a few years ago.

Automation is not a way of reducing labour content. It is a totally new way of doing business from planning, marketing, product development through manufacturing and distribution to servicing the product. All of these and more have to be re-thought with a totally new concept and perspective in mind.

Automation is the only alternative, considering the new demands for new, better and cheaper products moving into the marketplace faster, and the consequent need for increased speed, flexibility, machine intelligence and integration.

The survival imperative has become the automation imperative. As someone put it succinctly: liquidate or automate! There is no way back.

For further information, contact: Peter A. Urban, Managing Director, Computer Integrated Manufacturing (528597 Ontario Limited), P.O. Box 7317, 1276 Sandhill Drive, Ancaster, Ontario L9G 3N6; Telephone: (416) 648-5011.

# The Search for New Life-Care Products

# BIOS

**I**N the past 60 years Canadians have provided the world with insulin, contributed to the polio vaccine, developed the first practical cancer diagnostic test (carcino embryonic antigen — CEA), introduced improved bone fracture healing techniques through continuous passive motion devices and created Pablum, that mainstay of early life for young Canadians.

Today, more than \$400 million worth of biomedical research and development is undertaken in Canada each year. Universities and corporations are constantly seeking to understand and treat disease, provide better vaccines and disease controls and improved hospital and home care.

Biomedical Investment Opportunities Services (BIOS) Inc.'s business is based on the reputation of Canada's major biomedical contributions, and the opportunities for future contributions that will evolve

from the annual outlay on health care research and development. This level of activity is built on both the internationally recognized research ongoing in Canadian hospitals and universities and on the number of specialized corporations providing biomedical services and products to world markets.

BIOS recognizes that health care companies worldwide are looking outside for new product opportunities and human resources to complement internal resources.

BIOS introduces the high-calibre medical researchers in universities and small biomedical companies in Canada and their promising projects to international health care companies involved in developing new products and services.

The company visits researchers, institutions and companies from coast to coast to discuss current projects and the information on each project is condensed into a two page "listing". This non-proprietary listing is reviewed and approved by the individual researchers and their employers prior to its controlled release to BIOS subscribers.

Companies and individuals providing information to BIOS do so free of charge while BIOS receives its compensation from its subscribers in the form of annual subscription fees.

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BIOS is currently expanding its services and now lists opportunities found in Canada and the U.S. European opportunities will be added. Current subscribers are based in North America, but will include European and Japanese groups this year.

*For further information on subscriptions or to announce your opportunities through BIOS contact:*  
John Fraser, BIOS Inc., 7 Sultan Street, Toronto, Ontario M5S 1L6;  
Telephone: (416) 967-5852.





# New Key to Meet the Productivity Challenge in Systems Development



**C**URRENT computer technology offers unprecedented potential for increased productivity in both private industry and government organizations.

Our ability to capitalize on this potential, however, depends on our ability to develop the required software to take full advantage of this technology.

On the other hand, software development has, up to now, been very labor intensive. In fact, the productivity of the software professional has only increased marginally over the past twenty years. This represents the major road block preventing most organizations today from taking full advantage of the productivity potential offered by computer technology.

Currently, the application backlogs in most organizations are increasing at a dramatic rate. At the same time, there is significant user and management dissatisfaction with computer systems which can be traced to poor system quality and maintainability.

The key to this dilemma is to tap the power of the computer to automate the systems development process.

Asyst Technologies inc., a Montréal-based software engineering firm has recently set a new milestone towards achieving this objective by announcing The Developer, another product within its Auto-Asyst family of software tools.

## Auto-Asyst — The Developer

Auto-Asyst — The Developer — is an integrated set of software tools running on an IBM PC or equivalent, in a portable, stand-alone and/or local area network (LAN) environment. It significantly increases the productivity of systems development professionals and the quality and maintainability of the resulting systems.

The Developer supports the systems development process, from the initial stages of information systems master planning through ongoing maintenance of an organization's software applications and documentation.

More specifically, The Developer provides automated support for most aspects of the analyst's, designer's and project manager's work. It is a powerful product used to:

- create, store and modify all flowcharts and structured diagrams, with sophisticated features linking the various elements of these diagrams to a data dictionary;

- manage all cross-references between elements, identifying which processes use which data, which programs use which files, etc.;
- store and access all elements related to the same application (or project) whatever their format (diagram, text, table, discrete values, etc.);
- validate the logic of a specification, a model or a system;
- assist in project estimating, planning and management;
- store and control the thousands of items of information needed to develop and maintain an application portfolio.

## A Solid Architecture

The value and potential of a commercial development (e.g., a new office complex) is closely related to the quality of its architecture and engineering. The same can be said of a software product.

The Developer was architected, designed and built using the most up-to-date software engineering techniques and methodologies, such as data and system modelling, structured analysis, design and programming, as well as the latest ergonomic concepts and user interface design.

## This results in:

- features, power and flexibility to answer today's requirements for increased quality and productivity in systems development; and
- an architecture to capitalize on the power of artificial intelligence for tomorrow's systems development.

## The Developer is made up of four major elements:

### The Development Encyclopedia

A powerful data base that supports all the information elements required for the execution and management of a systems development project and the maintenance of an application portfolio;

### The Workbench Tools

Constitutes the foundation that supports and links all the other modules together. It consists of the following interfaces:

- the User Interface;
- the Encyclopedia Interface;
- the Import/Export Functions.

### The Customizer

It enables each Auto-Asyst installation to adapt the product to its own environment, standards and practices.

### The Experts and Asystants

The Experts execute professional and project management tasks to replace work while the Asystants assist the professional and project manager to perform other tasks that cannot be automated in the most productive manner.

Each set of components has its own specific structure and functions, and communicates with other components through standardized interfaces.

This modular approach enables Asyst Technologies inc. to easily evolve the product at minimal cost to its customers. It also enables rapid incorporation of the latest technologies and software development techniques and methodologies.

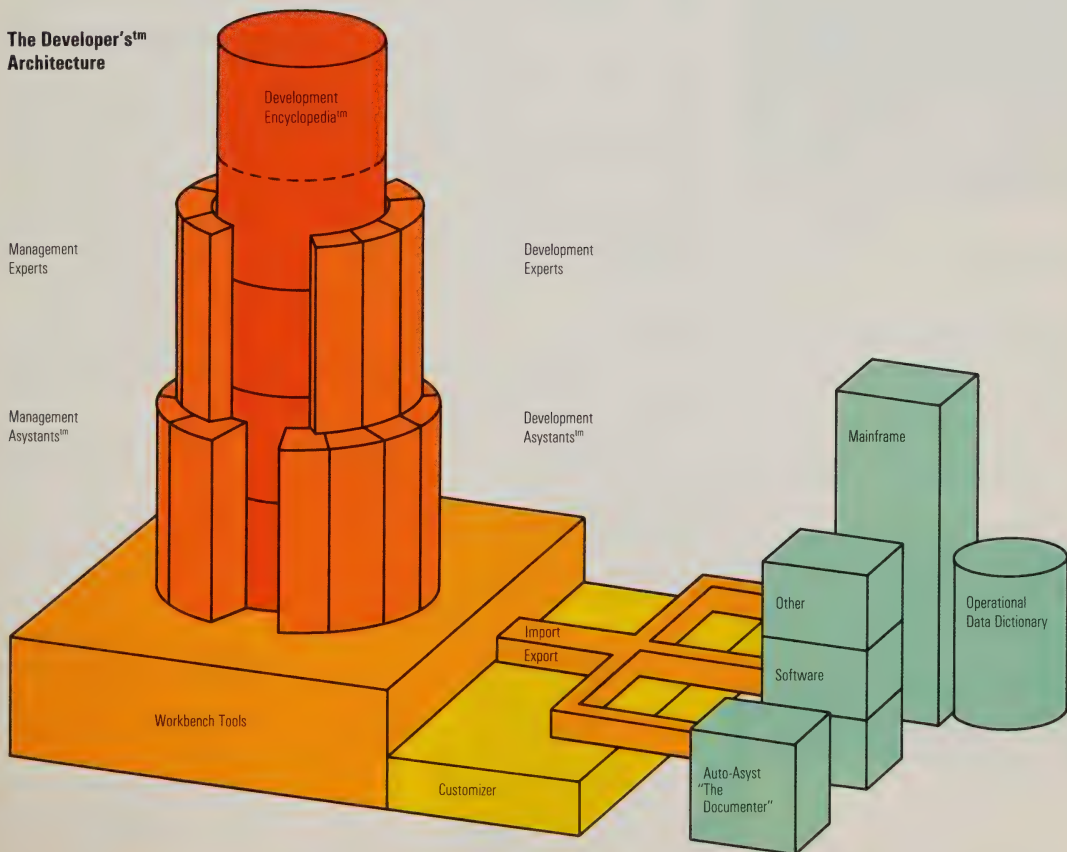
### Asyst Technologies inc.

Asyst Technologies inc. is a member of the Atkinson Tremblay Group, a leader in information systems architecture and engineering. Another member is Atkinson, Tremblay & Assoc. Inc., a consulting and systems development firm offering a variety of services in major North American cities.

*For more information on Auto-Asyst, write:*

Asyst Technologies inc.  
1080 Beaver Hall, Suite 1400  
Montréal, Québec H2Z 1S8  
Telephone: (514) 871-0108

### The Developer's™ Architecture





# Technology Transfers

## Offered

### Canada

- Charged Particle Detector
- Atmospheric Air Sample Collection Device
- Improved Zinc-Aluminum Casting Alloy
- Apparatus for Heating Granular Materials
- Ceramic Materials with Enhanced and Predictable Resistance to Fracture
- Purification of Hemoglobin and Modified Hemoglobin by Affinity Chromatography
- Small Aluminum Craft
- A Multi-Tasking DNC Coupler
- Gas Nitriding Process
- Autoskate Aids Motorists
- Device Detects Internal or External Corrosion in Carbon Steel Tube and Pipe
- Ultra-Sonic Instruments and Probes
- Ball Joint for Drilling
- Kitchen/Bar Rack System

### Britain

- New Soft Drink/Tonic
- Process to Renew Old, Used Files

### Denmark

- New Roofing Slate

### East Germany

- Production of Leather Fibre Material
- High-Speed Wire Drawing

### France

- Advanced Composite Material
- New Garment Cutting Technique
- Computer-Aided Design and Manufacturing of Hip Prosthesis
- Kiln for Wood and Other Solid Hygroscopic Materials
- New Tangential Filtration Process
- Automatic Sampling of Bulk Materials
- Instantaneous Assessment of Metal Structures

### Iceland

- Geodesic Dome Construction System

### India

- Emergency Lights and Torches
- Feed Water Treatment

### Israel

- Immunohistology and Veterinary Diagnostic Kit
- Technology Enhancement for Solar Cells
- Veterinary Diagnostic Kits
- Mobile Real-Time X-Ray Screening System
- Real-Time X-Ray Vehicular Screening System
- Optical Elements for Infrared Systems
- Food Irradiation
- 4-Fold Stretcher

### Switzerland

- Universal Pipe Joint Concept
- High-Energy Concentrate for Dairy and Beef Cattle

### U.S.A.

- Clean Energy from Waste Coals

### West Germany

- Plastics and Metals Combination for Knobs and Handles

## Requested

### Canada

- Security Products and Systems
- CAD/CAM for Use in the Fabrication of Various Types of Craft

### Austria

- Wind Energy Recovery

### Dominican Republic

- Cooling Units

### European Community

- Miscellaneous Products
- Agricultural Machinery
- Materials Testing Equipment
- Steel and Metallurgical Products
- Rubber Sheets
- Photometric Material

### India

- Light Assembly Die-Castings
- Solar Heating Devices
- Pre-fabricated Buildings
- Cranes, Material Handling and Industrial Equipment
- Microwave Ovens
- Building Chemicals
- Energy Systems and Devices
- Wireless Intercom
- Electronic Telephone Receivers

### Ireland

- Industrial Maintenance Products

### Kenya

- Renewable Energy Devices

### Nigeria

- Bricks

### Switzerland

- Miscellaneous Machinery and Equipment

### West Germany

- Chemical Specialties and Additives
- Manipulation Systems, Hydraulic Controls and Actuators
- New Technology in Magnetics
- New Products

## Canada

### Charged Particle Detector 7838

This detector of secondary charged particles is capable of analysing relatively large specimens in electron, ion or particle probe instruments, such as scanning electron microscopes, mass spectrometers, X-ray detectors, light detectors, back scattered electron detectors, secondary electron detectors, energy spectroscopes, electron energy analysers, Auger analysers, etc. The particular advantage of this device is its long lateral 'reach' into confined or cluttered spaces such as that between the final lens of a scanning electron microscope and a large planar specimen.

### Atmospheric Air Sample Collection Device 7887

A device for collecting environmental air samples used for industrial occupational or hygienic environmental monitoring. This low-cost, disposable, self-filling and self-sealing device requires simple handling and is easily adaptable to automation.

### Improved Zinc-Aluminum Casting Alloy 7944

Zinc-aluminum foundry casting alloys with 8 percent, 11 percent or 27 percent aluminum can be improved by the addition of less than 0.06 percent strontium. This additive used in combination with proper riser volume, pouring temperature and sand system consistently produces castings without underside shrinkage defects.

### Apparatus for Heating Granular Materials 7968

An apparatus for efficient and uniform heating of various kinds of seeds, nuts or beans using simultaneously, hot gas and microwave energy. The system could be used for drying, roasting, enzyme inactivation, pasteurization or sterilization. A prototype was built and tested.

### Ceramic Materials with Enhanced and Predictable Resistance to Fracture 8381

These ceramic materials and, specifically, partially stabilized zirconia employing Beta-alumina, can be made with a high Weibull Modulus, greater than 40 (steel has a Weibull Modulus of 50) with a probability of fracture of one sample per 1000. These ceramics, which have a high resistance to fracture at low and high temperatures, can be used for turbine com-

ponents, for cryogenic environments and for applications where conductive heat transfer is not desired.

### Purification of Hemoglobin and Modified Hemoglobin by Affinity Chromatography 8421

This invention involves the isolation of high purity (oxy) hemoglobin in a one-step chromatographic procedure, using gentle conditions which do not disrupt the native structure of the protein or its binding characteristics. The procedure is readily adapted to the large-batch preparations necessary for scaled-up production of hemoglobin-based blood substitutes.

*For any of the offers listed above, write to: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3. Telephone: (613) 990-6100.*

*Please quote the appropriate case number.*

### Small Aluminum Craft

A Canadian firm is offering through a licensing or joint-venture arrangement, its technology related to the manufacture of small aluminum craft (up to 65'). These include fishing vessels, survey launches, fast rescue craft, pleasure craft, and work boats.

*Write to: Gary Luton, Marketing Sales, Crockett McConnell Inc., P.O. Box 500, Bridgewater, Nova Scotia B4V 2X6. Telephone: (902) 543-9100.*

### A Multi-Tasking DNC Coupler

The Canadian Institute of Metalworking is offering to Canadian companies a license for the manufacture of its "CIMlink", a multi-tasking DNC coupler. It is claimed that it has many advantages, among them the elimination of paper tapes and the capability of being used as a terminal, at the shop floor, to collect the work-in-process data and retrieve manufacturing information.

*Write to: P. Urban, Canadian Institute of Metalworking, 1276 Sandhill Drive, P.O. Box 7317, Ancaster, Ontario L9G 3N6.*



### Gas Nitriding Process

A Canadian firm is offering, through a licensing agreement, its technology related to a new gas nitriding process. It is claimed to improve performance and durability of components when used by parts manufacturers while at the same time substantially reducing costs. The firm claims this new process of enriching the surface layer of steel with nitrogen results in the formation of a hardened surface of machine components with improved fatigue, wear and/or seizing resistance.

*Write to: M.J. Korwin, President, Nitrex Metal Inc., 3480 Poirier Blvd., St-Laurent, Quebec H4R 2J5.*



### Autoskate Aids Motorists

A Canadian firm is offering under licensing agreement, the "autoskate". The firm claims that the device is quickly attached to a wheel disabled by a flat thereby allowing the driver to reach a garage without further damage to the tire and the rim. The device is secured by attaching safety chains to pre-installed hooks and can be used on all types of cars, front or rear wheel drive, and trailers (boat, house, camper, etc.).

*Write to: FTN International, P.O. Box 855, NDG, Montréal, Quebec H4A 3S3. Telephone: (514) 484-5415.*





### **Device Detects Internal or External Corrosion in Carbon Steel Tube and Pipe**

A Canadian company is offering to Canadian firms, through licensing or joint venture its technology related to a device which detects internal or external corrosion in carbon steel tube and pipe. It is computer controlled and comes with a probe launcher. The inventor claims that this instrument can analyse the level of corrosion in a 12.2-m (40-foot) exchanger tube in less than 90 seconds. Suggested applications: exchanger tubes, pipelines, well tubing and casing, drillpipe, process pipe, furnace and boiler tubes.

*Write to:* D. Russell, Russell Ultra-Sound Services (NDT) Ltd., 4909-75th Avenue, Edmonton, Alberta T6B 2S3.

### **Ultra-Sonic Instruments and Probes**

A Canadian company is offering to Canadian firms, through licensing or joint venture an ultra-sonic system, consisting of instruments and probes to inspect plastic pipe in the factory for wall thickness variations. The instrument can control the haul-off speed from the extruder.

*Write to:* D. Russell, Russell Ultra-Sound Services (NDT) Ltd., 4909-75th Avenue, Edmonton, Alberta T6B 2S3.

### **Ball Joint for Drilling**

A Canadian firm is offering through a licensing or joint-venture agreement, a ball joint for use in drilling from moving "floating" platforms. The firm claims the ball joint can transmit high torque of 135 558 Nm (100 000 ft. lbs.) or more, while accommodating angular misalignment up to three degrees, and can also transmit high thrusts or tensions 1 800 kg (200-ton force) while revolving. It is claimed that in addition to the transmission of high forces, the ball joint can internally transmit up to three separate fluids or drilling mediums.

*Write to:* Patrick Bermingham, Berminghammer Corporation Limited, Wellington Street Marine Terminal, Hamilton, Ontario L8L 4Z9.

### **Kitchen/Bar Rack System**

An Ottawa designer with two Canadian design registrations and U.S. patents pending wishes to sell outright or licence, manufacturing and marketing rights to a kitchen rack design and a bar rack system which holds glass stemware and/or wine bottles in both horizontal and vertical formats. Applicants should have capacity to work in small-diameter rod or tube and offer plated or plastic coated finishes. Wide-ranging sales potential including both residential and commercial markets.

*Write to:* J.M. Fagan, 260 Daniel Avenue, Ottawa, Ontario K1Y 0C8.

*Telephone:* (613) 728-2338.

## **Britain**

### **New Soft Drink/Tonic**

A British firm is offering to Canadian companies, through licensing, its technology related to a new soft drink/tonic. The firm claims that this unique, refreshing drink caters to those engaged in sports activities, strenuous work or exercise, sauna and high ambient temperatures. It is formulated to replace both salts lost through perspiration and lost energy,

provide a store of energy on a "time-release" basis, protect from premature tiredness and quench thirst.

### **Process to Renew Old, Used Files**

A firm from Britain is offering to Canadian companies, through licensing, technology related to a process for renewing and resharpening old, used files. It is claimed that this process enables companies to save between 25 and 40 percent of their file purchase costs.

*For the offers listed above, write to:* Derek Rowlands Technology Transfer, Ray House, Westgate, Kent CT8 8QA, Great Britain.

## **Denmark**

### **New Roofing Slate**

A Danish firm is offering to Canadian companies, through licensing, technology related to its asbestos-free roofing slate with a natural finish. The company claims that this new slate has outstanding strength, durability and is frost resistant. It has been successfully tested in Scandinavia for resistance to most severe climates.

*Write to:* Commercial Office, Royal Danish Consulate General/Toronto, 151 Bloor Street West, Suite 310, Toronto, Ontario M5S 1S4.

## **East Germany**

*For more information on the following, please write to:*

L. Zanker, Manager Marketing Department, Zentrales Büro für Internationalen Lizenzhandel, Fernschreiber, Berlin O 112 191, East Germany.

### **Production of Leather Fibre Material**

A German firm is offering to a Canadian company a licensing arrangement for technology for the manufacturing and processing of a leather fibre material made from leather waste. The fibre is produced in the form of sheets or rolls and may serve as the starting material for the manufacture of insoles, counters and heel seats in the footwear industry, purse-making, and bookbinding. It is claimed that the production of this fibre material is non-polluting.

### **High-Speed Wire Drawing**

A group of German inventors is offering to Canadian firms, through licensing, technology for the rational cold forming of wires by drawing, with the use of the novel type of high-performance lubricant developed by the inventors. The technology is suitable for the drawing of wire from steel and nonferrous metals, including high-melting metals and metallic compound materials. The inventors claim that this technique has several advantages, e.g., the forming can be done on the basis of great reductions in cross sections down to 50 percent per pass and with drawing speeds of more than 500 m/min even in case of highly alloyed steel wire.

## **France**

### **Advanced Composite Material**

A French company is offering to a Canadian firm under licensing or joint-venture arrangements, technology pertaining to a new composite material used in the manufacture of hooped/armoured pipes,

hooped vessels, braided/woven/thermoshaped mechanical components, engineered finish products as well as a variety of other products.

*Write to:* Jacques Bernard, Spiflex, 33, quai De Dion-Bouton, 92814 Puteaux, France.

### **New Garment Cutting Technique**

A French inventor is offering Canadian companies, under licence, technology for a new garment cutting technique. The inventor claims that this new technique makes it possible to reduce the quantity of raw materials needed and that it will lead to savings, in time, of from 25 to 45 percent, depending on the style and type of garment involved.

*Write to:* H. Brzustowski, 6, rue du XXème Corps Américain, 57000 Metz, France.

### **Computer-Aided Design and Manufacturing of Hip Prosthesis**

A French firm is offering to Canadian companies, through a licensing agreement, technology related to the computer-aided design and manufacturing of hip prosthesis. It is claimed that the computerization of the prosthesis involves over 900 points which are elaborated by software specially developed for this application. The prosthesis is made of titanium alloy, material which exhibits very interesting mechanical features such as high strength and a Young's modulus closer to that of bone than other materials.

*Write to:* Monsieur Cravoisy, GERDIC, 52, rue d'Alima, 88000 Epinal, France.

### **Kiln for Wood and Other Solid Hygroscopic Materials**

A French inventor is offering Canadian companies, under a licensing agreement, technology involving a process for the installation of a kiln for drying hygroscopic materials, especially wood, at temperatures below 100°C and at subatmospheric pressure. The inventor claims that this speeds up drying and offers optimum product quality.

*Write to:* Cabinet Etudes Techniques J.P. GAUTREAU, Impasse de l'Ecole, 21200 Beaune, France.

### **New Tangential Filtration Process**

A French company is offering Canadian companies, under licence, technology for a new tangential filtration process using mineral membranes, which reduces operating costs and results in considerable saving of time. The company states that this technique can be used (1) in all branches of the agri-food industry for the sterile filtration of fruit juices, concentration and separation of proteins, concentration and selection of yeast and crystallized substances (sugar refineries and distilling industry) and (2) in water treatment processes such as clarification, purification of water for drinking purposes and sterilization, in rural and urban areas, hospitals and the pharmaceutical industry, etc.

*Write to:* Mr. Castellás, IMECA, Z.I. B.P. 94, 34800 Clermont L'Herault, France.

### **Automatic Sampling of Bulk Materials**

A French company is offering Canadian companies, under licence, technology involving a new process for the automatic sampling of bulk materials. This sampler is operated entirely by a programmable robot and is intended for professionals using and analysing

powdered, granulated or liquid products stored in bulk as well as for the agri-food, chemical products, glass and ceramics, oil, mining, building and public works industries.

*Write to:* Mr. Dufief, Serval International, B.P. 4, 78800 La Mothe Saint Heray, France.

### **Instantaneous Assessment of Metal Structures**

A French company is offering Canadian firms, under licence, technology involving a mechanical device that can memorize the cyclical stress applied to a structure by totalling the damage caused by each load cycle while taking into account the value of the corresponding amplitudes. This system is intended specifically for structures that are subject to stress, such as cranes of all kinds, lifting equipment, travelling cranes, engineering structures, sea structures, iron and steel industry equipment, equipment made of aluminum, etc.

*Write to:* Mr. Chevalier, STAS, 77, rue Henri Brisson, 78500 Sartrouville, France.

### **Feed Water Treatment**

Manufacturers of a corrosion inhibitor compound offer technical assistance, know-how and co-operation for the treatment of feed water in steam boilers, cooling systems and heating systems.

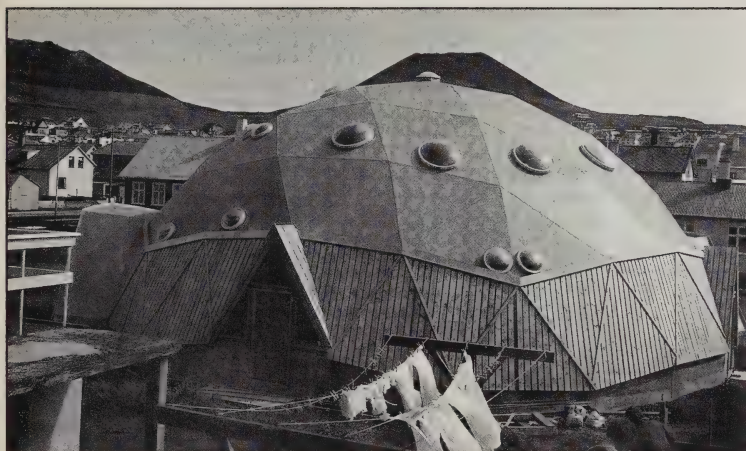
*Write to:* H. Natarajan, Vigneshwar Enterprises, "Medhuban" Industrial Estate P.O., Trivandrum 695 019, India.

### **Israel**

#### **Immunohistology and Veterinary Diagnostic Kit**

An Israeli firm is offering to Canadian companies through a joint-venture agreement, technology related to production of its immunohistology and veterinary diagnostic kits. This new technology permits the specific demonstration of cell and tissue antigens in a variety of fixed tissues.

*Write to:* Bio-Yeda Ltd., Kiryat Weizmann, Rehovot 76326, Israel.



### **Iceland**

#### **Geodesic Dome Construction System**

An Icelandic firm is offering licensing or joint-venture arrangements to a Canadian firm to produce and market its "Geodesic Dome Construction System" for Canadian and U.S. markets. It is claimed that the total erection of the dome will take a minimum amount of time (i.e. 12.2 m dome needs 150 person-hours). No special metal connectors are necessary. There are a variety of outside finishes and it is claimed that energy savings of a 15.2 cm insulation in a 18.2 m dome is up to 66 percent.

*Write to:* Einar Thorsteinn, Construction Lab, P.O. Box 62, Reykjavik, Iceland.

### **India**

#### **Emergency Lights and Torches**

Sophisticated silicon-controlled rectifier design for charging as well as totally solid-state switching circuitry, is offered by manufacturer of emergency lights and torches.

*Write to:* Bhatts Electronics (P) Ltd., 8/1, Palmgrove Road, Bangalore 560 047, India.

#### **Technology Enhancement for Solar Cells**

An Israeli inventor is offering to Canadian companies through a licensing agreement, technology related to a fluorescent panel enhancing sunlight for solar cells. The inventor claims that this new development should considerably reduce the price of power from solar cells and that even on a cloudy day the panel can collect enough energy to power the cells.

*Write to:* Moshé Vigdor, Yissum Research Development Company of the Hebrew University of Jerusalem, P.O. Box 4279, Jerusalem 91042, Israel.

#### **Veterinary Diagnostic Kits**

An Israeli firm is offering to Canadian companies through a joint-venture agreement, technology related to the production of veterinary diagnostic kits called "ImmunoComb" for detection of the Newcastle disease in poultry.

*Write to:* Organics Ltd., P.O. Box 360, Yavne 70650, Israel.

*For all the following offers please write to:*

Mr. I. Laufer, Soreq Nuclear Research Center, Yavne 70600, Israel.

### **Mobile Real-Time X-Ray Screening System**

An Israeli organization is offering to Canadian companies through a licensing arrangement, technology related to a mobile inspection system for medium-size cargoes. The system is claimed to be a rapid, comprehensive radiographic cargo inspection at air and sea ports, freight depots, customs warehouses, border crossing points and other fixed transit locations across which unauthorized cargo could be transported.

### **Real-Time X-Ray Vehicular Screening System**

An Israeli organization is offering to Canadian companies through a licensing arrangement, technology related to an X-ray imaging system designed as a fixed installation for the automatic scanning, in less than one minute, of passenger cars, pick-up trucks and small vans.

### **Optical Elements for Infrared Systems**

An Israeli organization is offering to Canadian companies through licensing, technology related to optical elements for infrared systems. These are claimed to offer advantages in terms of costs and high optical quality.

### **Food Irradiation**

An Israeli company is offering to Canadian firms through licensing, technology used to improve and preserve foods. The company claims that this new process extends shelf-life of fruits and vegetables, fresh meat, fish and poultry. It also decontaminates stored grains, pulses, nuts and citrus fruits and reduces or eliminates pathogenic organisms in a variety of foods and animal feeds.

### **4-Fold Stretcher**

An Israeli firm is offering to Canadian companies through a licensing agreement, technology for a 4-fold stretcher which can be used in many areas such as military and police rescue, civil defense, camps, parks, ski resorts, etc. The inventor claims many advantages, such as: super compactness ( $55 \times 16.5 \times 11.5$  cm when folded); lightness (about 7 kg); high strength and durability — proven during extensive field trials; resistance to extreme conditions such as weather, mud, sand and water; the cover can be replaced in a matter of minutes without tools; deployment is easy and does not require special training and can be done in total darkness. Several optional accessories can be added.

*Write to:* Z.M. Zimal Development Co. Ltd., P.O. Box 645, Holon 58105 Israel.

### **Switzerland**

#### **Universal Pipe Joint Concept**

A Swiss firm is offering to a Canadian company through licensing arrangement, the right to manufacture its universal pipe joining concept which although simple and rapid in use, apparently provides a maximum of safety. The company claims that this concept replaces flanges, fittings, welds and many other pipe joining methods. It can be applied to virtually all kinds of pipelines from the small water pipe.

*Write to:* Kurt Frey, Commercial Officer, Canadian Embassy, Kirchenfeldstrasse 88, CH-3005 Berne, Switzerland.



## High-Energy Concentrate for Dairy and Beef Cattle

A Swiss firm is offering to Canadian companies through a licensing or joint-venture agreement, its technology related to the manufacturing of high-energy concentrate for dairy cows and beef cattle. The firm claims that this unique product is a rumen-bypass product, and is entirely natural containing 92 percent crude fat (no protein or fibre). It is also claimed that feeding costs per litre of milk and per kilogram of meat are lower than with conventional compounds; milk production potential of mixed feed is about 25 percent higher than in conventional dairy mixed feed.

*Write to:* Ernest Boehlen Corporation, P.O. Box 242, CH-4900 Langenthal, Switzerland.

## U.S.A.

### Clean Energy From Waste Coals

An American firm is interested in forming a joint-venture partnership for pilot plant testing and commercialization of its process to produce clean energy from waste coals. The company claims that this new process facilitates the direct combustion of coal refuse materials, oil shales, and low-grade coals, to generate low-cost electric power and to produce oil economically.

*Write to:* James Mayer, President, A.J. Mayer International, Inc., Suite 409, 993 Old Eagle School Road, Wayne, Pennsylvania 19087.

## West Germany

### Plastics and Metals Combination for Knobs and Handles

A West German firm is offering to Canadian companies, through a licensing agreement, a system for the manufacture of handles, knobs, holders, etc. from a combination of steel and plastics, in all colours and heat resistant up to 300° Celsius. These can be used as accessories for cookware made of aluminum, enamel and stainless steel. The technique of combining plastic and metal as well as the tools necessary for production are an essential part of the offer.

*Write to:* Dr. Gregory, Th. Schemm Metall-und Kunststoffwarenfabrik, 5952 Attendorn, Papiermühle, West Germany.

# Requested

## Canada

### Security Products and Systems

A Canadian company is seeking under licensing agreement, unique technology related to security products and/or systems for application in the prevention of break-ins and theft in residences, highrises and single dwellings, and highrise offices, hotels and motels.

*Write to:* J.P. Jacob, Biomed Holdings Ltd., P.O. Box 580, Tottenham, Ontario L0G 1W0.

### CAD/CAM For Use in the Fabrication of Various Types of Craft

A Canadian company is seeking through licensing or joint-venture arrangements, new technology related to products that could complement its CAD/CAM facility used in the fabrication of fast rescue craft, hydrographic vessels, commercial craft, etc.

*Write to:* Gary Lutton, Marketing Sales, Crockett McConnell Inc., P.O. Box 500, Bridgewater, Nova Scotia B4V 2X6.

*Telephone:* (902) 543-9100.

## Austria

### Wind Energy Recovery

An Austrian firm is seeking know-how and technology for energy recovery from wind to produce wind turbines up to 1 000 W.

*Write to:* Otronic GmbH, Spinozagasse 20, A-1170 Vienna.

## Dominican Republic

### Cooling Units

Technology sought to repair hermetically sealed condensing units for refrigeration equipment.

*Write to:* Helmut Schorgmayer, Director, Centro de Estudios Energeticos y Recursos Naturales, Universidad Catolica Madre y Maestra, Santiago de los Caballeros.

## European Community

### Miscellaneous Products

A British firm specializing in various industrial sectors (production of fibreglass wool insulation for boats; trade in defence equipment and electrical cables; services for cathodic production and electrolytic water treatment) is seeking partners for joint marketing.

*Reference No:* BRE/8718/49

## Agricultural Machinery

A French manufacturer of agricultural machinery, fertilizer spreader trailers, tipping trailers and slurry tanks is seeking a partner for joint research and development of new products.

*Reference No:* BRE/8704/32

## Materials Testing Equipment

A German manufacturer of temperature probes, electronic measuring equipment and computer hardware for the chemical, glass, synthetic products and ceramics industries, for manufacturers of materials testing equipment and manufacturers of furnaces and research laboratories, is seeking a partner for joint marketing.

*Reference No:* BRE/8507/34

## Steel and Metallurgical Products

Spanish manufacturer of various products for the steel and metallurgical industries seeks partner for exchange of technology and know-how.

*Reference No:* BRE/8710/22

## Rubber Sheets

A Spanish producer of rubber sheets, rubber profiles and moulded articles is seeking a partner for exchanges of technology and know-how.

*Reference No:* BRE/8744/48

## Photometric Material

Spanish topographical surveying firm, using photometric material from aerial surveying operations, seeks engineering partners engaged in remote sensing for acquisition of technological know-how.

*Reference No:* BRE/8733/50

*For more information on these and other requests please write to:*

Business Co-operation Centre, 6 Rond-Point Schuman, Boite 3, B-1040 Brussels, Belgium.

## India

### Light Assembly Die-Castings

Manufacturer of non-ferrous die-castings seeks technical and commercial co-operation to manufacture light assemblies based on die-castings with buy-back arrangements.

*Write to:* Director, Surya Die-castings Pvt. Ltd., 511 Kakad Market, 306, Kalbadevi Road, Bombay 400 002, India.

**For the following requests, direct enquiries to:**

Mr. Han-Chol Kang, Adviser, Technology Utilisation, Asian and Pacific Centre for Transfer of Technology, 49 Palace Road, P.O. Box 115, Bangalore - 560052, India.

*Please quote the project number.*

**Solar Heating Devices** (Project RE-55a)

An Indian firm is seeking to enter into a joint-venture or licensing agreement with a Canadian company to acquire new technology related to the fabrication of solar heating devices.

**Pre-fabricated Buildings** (Project LCC-59)

An Indian firm is seeking to enter into a joint-venture or licensing agreement with a Canadian company to acquire new technology related to the manufacture of pre-fabricated buildings suitable for the farming community.

**Cranes, Material Handling and Industrial Equipment** (Project MISC-22)

An Indian firm is seeking to enter into a licensing agreement with a Canadian company to acquire new technology related to cranes and material handling and industrial equipment.

**Microwave Ovens** (Project EE-38)

An Indian firm is seeking to enter into a licensing agreement with a Canadian company to acquire new technology related to domestic microwave ovens.

**Building Chemicals** (Project LCC-1)

An Indian firm is seeking a licensing agreement with a Canadian company for the acquisition of technology related to admixtures for building chemicals such as waterproofing compounds, adhesives, floor hardeners, etc.

**Energy Systems and Devices** (Project RE-56)

An Indian firm is seeking to enter into a licensing or joint-venture agreement with a Canadian company to acquire new technology related to alternate and renewable energy systems and devices to be used in windmills, wind generators, solar pumps, solar refrigerators and solar systems.

**Wireless Intercom** (Project EE-2)

An Indian firm is seeking a licensing agreement with a Canadian company for the acquisition of new technology related to wireless intercom.

**Electronic Telephone Receivers** (Project EE-30)

An Indian firm is seeking a joint-venture arrangement with a Canadian firm to acquire new technology related to all types of electronic telephone receivers which have better acoustic characteristics than the electro-magneto version and are ideally suitable for semi-automated, mass production techniques.

**Ireland****Industrial Maintenance Products**

An Irish company is seeking, under licensing or joint-venture arrangements, new technologies related to industrial maintenance products, such as metal sprays, lubricants in aerosol spray canisters, sealants in tube and can form, high precision rubber component manufacturing, and other new products and processes.

*Write to:* G. McIvor, Chemoflon GmbH. Seals and Packings, 48 Cookstown Industrial Estate, Tallaght, Co. Dublin, Ireland.

**Kenya****Renewable Energy Devices**

Financial assistance, equipment and, possibly, joint venture sought to manufacture renewable energy devices such as solar water heaters and photovoltaic, biogas and wind energy systems for small-scale power generation and water pumping. Infrastructure available.

*Write to:* C.O. Rioba, Solar World (E.A.) Ltd., P.O. Box 2472, Kisii, Kenya.

**Nigeria****Bricks**

Technical assistance, machinery, equipment and co-operation sought to set up a refractory plant for the production of 10 000 to 20 000 tonnes of refractory mortar, high alumina and fireclay bricks per year.

*Write to:* E.P. Obidigbo, Managing Director, Acton Techniques Ltd., P.O. Box 3344, Surulere, Lagos, Nigeria.

**Switzerland****Miscellaneous Machinery and Equipment**

A Swiss trading house is interested in buying from Canadian firms, the following equipment:

- Steel sandwich panels with rockwool insulation (warehouse panels)
- Equipment to manufacture skis (snow)
- Machines for the manufacture of ceramic products (insulators, bricks, tableware)
- Viscose pulp mill with capacity of 100 000 tonnes per year. Plant is to refine hardwood.
- Machinery to produce flexible packaging (i.e. milk, juice containers, food and frozen food, etc.) with a capacity of 60 000 tonnes per year.
- Painting equipment including spray powder, coating and pumps.

*Write to:* Mr. Atle Lygren, Bex Corporation, 12, rue de la Combe, 1260 Nyon, Switzerland.

**West Germany**

*For more information on the following requests, please write to:*

G. Schaudé, Innovationsberatung, Finkenstrasse 14, D-7534 Birkenfeld, West Germany and indicate the SP number.

**Chemical Specialties and Additives** (SP 8306)

A West German firm is seeking a licensing arrangement for the acquisition of new technology for the manufacture of new products in the field of chemical specialties/additives for rubber, sugar, yeast, paper and sealant industries, and water and waste water treatment. The new products should rate as specialty products, be of high quality, provide high yields and be patented or patentable.

**Manipulation Systems, Hydraulic Controls and Actuators** (SP 8422)

A West German firm is seeking a licensing arrangement with a Canadian company for the acquisition of new technology in the field of manipulation systems, hydraulic control elements and hydraulic actuators applicable to the following areas: robots, valves, actuators, sensors and hi-tech hydraulic components.

**New Technology in Magnetism**

A West German firm specializing in the manufacture of measuring instruments is seeking through licensing or joint-venture arrangements, a new technology; namely, a new physical principle to replace conventional magnets in magneto-electric measuring instruments. This new technology must meet the following requirements: have great coercive force, be easy to magnetize and demagnetize, easy to form (mould, cast, sinter, etc.) and must be cheaper than competitive products.

*For information on the following, write to:*

Dr. H. Wenzl, Batelle-Institut E.V. Am Romerhof 35, Postfach 900160, 6000 Frankfurt am Main 90, West Germany.

**New Products**

A West German firm is seeking, through licensing, new technologies related to machines where drive unit and functional unit are integrated into one, equipment to protect, in the immediate environment of large machines, against noise, vibrations, etc., and machines or other devices to generate or utilize strong magnetic fields.

Another West German firm is seeking, through licensing arrangements, new technologies related to products made from engineering plastics (fibre-reinforced, conducting, etc.), sensor applications, products used for assembly and joining of components, tubes, etc., in particular those suitable for automatic assembly (including tools, necessary machines, etc.) and special tubing (up to 20 mm outer diameter).



# Special Events

## Summary

### West Germany

- IENA '86  
Nuernberg — November 1986

### Hong Kong

- Consumer Products Exhibition  
Hong Kong — November 1986

### West Germany

- International Plastics and Rubber Trade Fair  
Dusseldorf — November 1986

### Britain

- Techmart 86  
Birmingham — November 1986

### Canada

- IHC '86  
Toronto, Ontario — November 1986

### West Germany

- Technology Forum Berlin  
Berlin — November 1986

### Belgium

- Eureka 35th World Inventions Exhibition  
Brussels — November/December 1986

### Canada

- Toronto Home Builders Assn., Annual Conference and Trade Show  
Toronto, Ontario — December 1986

### India

- Aluminum Congress  
New Delhi — January 1987

### Malaysia

- ELENEX '87  
Kuala Lumpur — March 1987

### France

- 1987 International Symposium on Wood and Pulp Chemistry  
Paris — April 1987

### IENTA '86

#### International Exhibition for Ideas, Inventions and New Ideas

Nuernberg Fairground  
Messezentrum Nuernberg  
Federal Republic of Germany  
November 5-9, 1986  
*Contact:* AFAG Ausstellungs-ges. GmbH, Messen-  
zentrum Nuernberg, D-8500 Nuernberg,  
West Germany  
*Telephone:* 0911/86691, Telex: 622080

#### Hong Kong Trade Fair Consumer Products Exhibition

Hong Kong Exhibition Centre  
Hong Kong  
November 6-9, 1986  
*Contact:* Hong Kong Trade Fair Ltd., 4306 China  
Resources Bldg., 26 Harbour Road, Hong Kong  
*Telephone:* 5-736211, Telex: 68444 HKTF HX

#### International Plastics and Rubber Trade Fair

Fairgrounds  
Dusseldorf, Federal Republic of Germany  
November 6-13, 1986  
*Contact:* Dusseldorfer Messegesellschaft mbH,  
NOWEA, Postfach 32 02 03, 4000 Duesseldorf 30,  
West Germany  
*Telephone:* (02 11) 4 56 01, FS: 8 584 853

### Techmart 86

National Exhibition Centre  
Birmingham, England  
November 11-14, 1986  
*Contact:* Helen Lord, National Exhibition Centre Ltd.,  
Birmingham B40 1NT, England  
*Telephone:* 021-780 4141

#### IHC'86: The International Innovative Housing and Components Exhibition

Metro Toronto Convention Centre  
Toronto, Ontario  
November 12-16, 1986  
The exhibition represents a multilateral trade opportunity for manufacturers, suppliers and users from around the world who will display new and innovative housing technology and components.  
*For additional information contact:* IHC'86, Manumod Exhibitions Inc., 209-77 Mowat Avenue, Toronto, Ontario M6K 3E3  
*Telephone:* (416) 533-4888

### Technology Forum Berlin

International Innovation Market  
Exhibition and Congress  
Berlin, Federal Republic of Germany  
November 25-28, 1986  
*Contact:* AMK Berlin Ausstellungs-Messe-Kongress GmbH, Messedamm 22, 1000 Berlin 19, West Germany  
*Telephone:* 030/3038/1, Telex: 182908

### Eureka 35th World Inventions Exhibition

Parc des Expositions  
Brussels, Belgium  
November 30-December 8, 1986  
*Contact:* Foire Internationale de Bruxelles, Parc des Expositions, 1020 Brussels, Belgium  
*Telephone:* 02/478.48.60, Telex: 23643

#### Toronto Home Builders Association Annual Conference and Trade Show

Metro Toronto Convention Centre  
Toronto, Ontario  
December 9-10, 1986  
*Contact:* Southex Exhibitions, 1 Scotsdale Rd., Don Mills, Ontario, M3B 2R2  
*Telephone:* (416) 445-6641

### Aluminum Congress

Vigyan Bhavan, New Delhi, India  
January 27-29, 1987  
*Contact:* High Commission of India, 10 Springfield Rd., Ottawa, Ontario, K1M 1C9  
*Telephone:* (613) 744-3751

### ELENEX '87

Putra World Trade Centre  
Kuala Lumpur, Malaysia  
March 25-28, 1987  
*Contact:* Malaysian Exhibition Services, 2nd Floor, Wisma Socfin, Jalan Samantan, 50490 Kuala Lumpur  
*Telephone:* 03-2551717/2550261

#### 1987 International Symposium on Wood and Pulp Chemistry

Palais de Congres-Porte Maillot  
Paris, France  
April 27-30, 1987  
*Contact:* Canadian Pulp and Paper Association, Sun Life Building, 23 Floor, 1155 Metcalfe St., Montreal, Quebec, H3B 2X9  
*Telephone:* (514) 866-6621

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# INNOVATION

Supplement to Canada Commerce

Winter 1986





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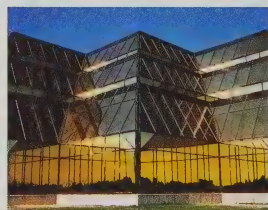
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This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad. Ideas for articles and information, even finished articles, will be welcomed.

We invite you to become a part of *Innovation* with your comments and ideas. You can contact us at:

## Innovation

Technology Transfer Services (EOII),  
Office of Industrial Innovation,  
Department of Regional Industrial  
Expansion, 235 Queen Street,  
Ottawa, Ontario K1A 0H5;  
Tel: (613) 954-3474.

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Hon. Michel Côté  
Minister of Regional Industrial  
Expansion  
Hon. Bernard Valcourt  
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and Tourism)



**T**HIS issue of *Innovation* takes a look at one of the new ideas in the federal government's continuing efforts to encourage small and medium-sized Canadian companies to adapt new, more efficient technologies and operating procedures. It is fitting that this concept, implemented by Harwill Technologies International Inc., of Ottawa, should be supported initially by the Industrial Research Assistance Program (IRAP) of the National Research Council.

Over the years IRAP has been considered one of Canada's most successful grant programs, promoted not only by NRC's Technology Advisors but also by the regional offices of the Department of Regional Industrial Expansion from coast to coast.

The Harwill idea, in a nutshell, was to provide expertise to small and medium-sized companies at every stage of the productivity improvement process, expertise which these companies did not have or could not spare from their day-to-day operations. The story starts on page 2.

Japanese management techniques are often touted as the answer to all the problems that

Canadian companies face. On the other hand, the social differences between the two cultures are great and it is often doubted whether the Japanese management style could be transferred to Canada. The efforts of one Canadian company in melding the two management cultures is told by an officer of the company, beginning on page 6.

Although much of the Canadian economy was, in the past, based on agriculture, the relative importance of this sector has been declining rapidly in concert with most other basic industries. In fact, Canada is fast approaching the time when the value of imports of fruits and vegetables will be equal to our exports of grain and other agricultural products.

A new trend, however, is emerging. Specialty growers are taking a new approach to food production. One such firm is Greens Alive whose story starts on page 10.

To round out this issue, we continue our series of provincial research councils, taking a look at both Saskatchewan and British Columbia, on pages 12 and 15.

## Industrial Research Assistance Program

All five finalists in the Technology Transfer category of the 1986 Canada Awards of Excellence received grants from the National Research Council's Industrial Research Assistance Program (IRAP), an indication of IRAP's importance to Canadian industry.

In addition, 17 of 37 finalists in the eight categories also benefitted from IRAP grants. The categories included Productivity, Marketing, Entrepreneurship, Technology Transfer, Labour/Management Co-operation, Innovation, Invention and Industrial Design.

The five Technology Transfer category finalists were:

- **Lab-Volt (Québec) Ltée** of Québec for its ANALOG Communications Training System;
- **Sci-Tec Instruments Inc.** of Saskatoon for its Brewer Ozone Spectrophotometer;
- **Almax Industries (1980) Ltd.** of Lindsay, Ontario, for the transfer of ceramic technology for manufacturing high-performance transducers;
- **Export Packers Company Ltd.** of Bramalea, Ontario, for transfer of technology to extract lysozyme from egg albumen efficiently; and
- **Canadian Farm Tec Systems** of Waterloo, Ontario, for one component in the transfer of technology for its computerized dryer control system for drying grain.



**A** successful combination of private enterprise and government expertise is opening doors in technology transfer for small and medium-sized Canadian companies.

Harwill Technologies International Inc. is an Ottawa firm created by a group of consulting engineers to expedite such transfers.

When the company was seeking ways to make its services known and help finance initial contacts, it seemed natural to approach the Industry Development Office of the National Research Council and the Office of Industrial Innovation of the Department of Regional Industrial Expansion, both key elements in technology transfer.

To investigate how Harwill's technology transfer program started and is progressing, *Innovation* brought together the main players for a round table discussion.

Participating in the discussion were (in order of appearance): Harvey Goodwin, president, Harwill Technologies International Inc.; Douglas Horne, vice-president, Harwill Technologies International Inc.; Dr. Don Cox, element manager, Industrial Research Assistance Program, National Research Council; Veli Dagpinar, chief, technology transfer, Office of Industrial Innovation, Department of Regional Industrial Expansion; David Younger, vice-president, Harwill Technologies International Inc.; William Lemmon, vice-president, Harwill Technologies International Inc.; Claus Hafner, manager, European operations, Harwill Technologies International Inc.

Here are the results of that mini-conference.

*Innovation:* Mr. Goodwin, what prompted you and your colleagues to start Harwill Technologies?

*Harvey Goodwin:* Basically, each of us at Harwill had spent many years either at major corporations or as consultants to major corporations involved in the transfer of technology. We were familiar with all the steps required to make technology transfer successful.

Frankly, we were tired of working for the big company. At the same time, we felt that smaller companies needed services we could provide to make their operations more efficient.

*Innovation:* But surely, even small companies have or could hire this expertise on staff?

*Douglas Horne:* Even if they have the expertise, for the most part small business managements are so burdened down with day-to-day operations that they cannot find time for implementing the changes required. Or they are distracted by other problems at crucial times and waste precious time and dollars on lost opportunities.

*Innovation:* We can see the need and why it would be cheaper for a small business to hire an outside consultant, but how did you come to form a sort of partnership with NRC and, more specifically, IRAP?

*Douglas Horne:* Well, of course, in our former work we had a lot of exposure to NRC's Industry Development Office. We realized that our service would be a good extension to the work carried out by its Industry Technology Advisors and that they would be excellent contacts with the business community, in particular the businesses we saw as our clients.



*Harvey Goodwin:* And, of course, we had to live until our billings started to come in. We are not wealthy and so we approached Dr. Cox with the proposition that IRAP would finance our initial contact with a client and, once an assessment of the situation was made, further negotiations for services would be between the client and Harwill Technologies.

*Innovation:* We can see how this arrangement would be advantageous to Harwill but Dr. Cox, how does it fit in with the IRAP and the Industry Development Office (IDO) mandates?

*Don Cox:* The IRAP and IDO mandates provide for the transfer of technology and the enhancement of productivity for Canadian industry.

The IRAP record in this regard has been very good. However, those of us in the field know that too often our Industry Technology Advisors (ITAs) spend a considerable amount of time and effort with clients without any visible results.

While some of this is due to the fact that a satisfactory solution to the problem could not be found, probably more is due to the fact that other pressing problems have diverted management's attention.

To us this was a double waste - a waste of our ITAs but also a waste of our clients' time since they lost an opportunity to upgrade their opera-

In conference at Harwill, left to right: William Lemmon, vice-president; Douglas Horne, vice-president; David Younger, vice-president; Harvey Goodwin, president; Claus Hafner, manager, European operation.



# Interview continued



**"...What better way to ensure business gets on with its task of making itself competitive on world markets than by bringing both private enterprise and government expertise to bear on solutions."**

tions. It seemed sensible to try to avoid this in any way possible.

The proposal that Harwill brought us seemed to be a possible solution. At least it was worth a try and, while the jury is still out, I would say that it seems to be working. Those clients we have introduced to Harwill seem willing to pay for the extra service – service the ITAs are unable to provide.

And, if the results are as promising as they now appear to be, there is no doubt in my mind that other firms will be willing to enter the field. It is an excellent way to fulfil the government's desire to increase private sector involvement in areas formerly dominated by government agencies.

*Veli Dagginar:* Speaking for the Office of Industrial Innovation, I might add that this idea works in well with our mandate to bring technology transfer, productivity and innovation to the attention of Canadian industry. What better way to ensure business gets on with its task of making itself competitive on world markets than by bringing both private enterprise and government expertise to bear on solutions. And it is a solution that is aimed at small business.

In our dealings with this sector of the Canadian economy, too often the term "technology transfer" conjures up visions of uncontrolled expense, red tape, paper burden and a host of other negative images. I would like to know whether this will be a problem with this program.

*David Younger:* I must admit that the attitudes you have described do exist. I think, however, that we can cut through these misunderstandings. A good place to start would be to define technology simply as "know-how". Furthermore, technology transfer takes place on a far more prosaic basis than is commonly imagined.

*Douglas Horne:* While this is true, at the same time technology transfer should be viewed as a powerful option for corporate growth. With the speed of change in industry today, companies cannot afford to stand pat, regardless of how secure their particular niche appears to be.

A company has two basic choices if it wants to maintain or enhance its position. Either develop new know-how through in-house research and development efforts, or acquire it from others. Certainly, there are advantages and disadvantages to both approaches but for small to medium-sized companies, it usually makes sense to acquire a proven technology.

*Innovation:* But surely an enormous array of technological data and government services currently are available to assist interested companies in acquiring technology. In addition to NRC and DRIE, represented here today, Energy, Mines and Resources, Agriculture, External Affairs and a host of other agencies both federal and provincial all have major assistance programs available to industry.

Canadian Patents and Development Ltd. and our own *Innovation* have long lists of technologies available for purchase or sale. Other countries are eager to buy or sell technology and some are very well organized to do it.

Given all these positive factors, why are so many Canadian companies still behind technologically or in need of even more assistance?

*Harvey Goodwin:* I suspect there are three main reasons. First, lack of knowledge as to how to access the system. Perversely, the sheer volume of data, services and programs available often daunts companies.

Second, people often are reluctant to deal with perceived government red tape.

Third, and by far the most important factor, is simply lack of time. The president of a small to medium-sized business is generally so busy managing the business, fending off bankers, solving production line problems, acting as chief labour negotiator and assisting with marketing that he or she has no time to address the issue of better technology even if the source of that technology is known.

**The hard realities are that, even given a corporate need and adequate sources of supply, the transfer of technology must follow a sequential process and must be supported at each stage by a variety of very specialized services.**

**Harwill Technologies International was established specifically to provide all these specialized services to Canadian industry.**

*Douglas Horne:* Generally there are four distinct stages in technology acquisition – identification, contracting, transfer and implementation. With the decision to acquire technology, the first step is to prepare a technology requirements specification. This documents in detail the specific requirements, operating parameters, process outputs and similar data.

This specification is then circulated to our correspondent network in Canada and other countries. Sources of technology are identified and analysed, and selected technologies presented to the client for consideration.

If a decision is taken to proceed further, we will advise and assist in negotiating an appropriate contract for technology acquisition.

*William Lemmon:* We then will manage the technology transfer process. Typically, this consists of assisting the technology source prepare working drawings, equipment specifications and operating procedures. Usually this work is carried out by our correspondent in the source country. The

technology package is then “Canadianized” to meet Canadian codes and standards and to incorporate Canadian equipment where possible.

The final stage, which we will also manage, is the construction or modification of a facility to produce the product.

*Harvey Goodwin:* We think our approach is unique in Canada, in that all services – from definition of need to final production – are available from one source. And the way we address the problem of technology transfer, assistance can be provided to a wide range of industries.

*Claus Hafner:* Practically, many companies cannot undertake the entire transfer process. They require only partial assistance, typically with definition of markets, productivity improvements, a business plan or a review of available technologies which might complement existing or lead to complementary lines. Often the most difficult part of the process is defining actual and practical requirements for technology.

We recognize these needs for partial services and have structured the firm to provide them. But our main purpose in the process is to provide that extra push that will ensure success to the whole project.

*Don Cox:* And that is NRC’s main reason for supporting Harwill in the initial stages of the process. The rest is up to the client. While other funds may be available under IRAP, the client is expected to pay for other services provided by Harwill.

**“...there are four distinct stages in technology acquisition – identification, contracting, transfer and implementation.”**



**“... While other funds may be available under IRAP, the client is expected to pay for other services provided by Harwill.”**



# Murata Erie North America Limited

## A Canadian experience with Japanese ownership

By Bruce N. Cox

Manufacturing Engineering Manager  
Murata Erie North American Limited

**I**N 1980, the former Erie Technological Products Company was acquired by Murata Manufacturing Company of Kyoto, Japan. A significant component in the acquisition was the Canadian operation located in Trenton, Ontario, and out of this, together with the later addition of a facility in Mississauga, Ontario, was formed Murata Erie North America Limited. The experience of Japanese ownership has been, and continues to be, interesting, invigorating and rewarding.



One of the most important results has been the joining of Japanese expectations of quality with Canadian innovative flair in product design and manufacture. It is fair to say that this combination contains useful and hopeful experience for many medium-sized Canadian companies with a broad product mix.

It is a generalization, which nevertheless appears to be true, that Japanese managers spend a lot of time investigating, consulting, planning and revising before acting. But, when action comes, it is swift and effective.

This contrasts to some extent with the North American concepts of "getting things done". Murata Erie in Trenton (METR), has combined the two philosophies into a management style which has less to do with Japanese ownership per se than with a sensible and effective appreciation of problems and how to solve them.

METR manufactures electromagnetic interference (EMI) filters, filtered connectors, power suppliers and special filtered circuits for the suppression of electrical "noise". The technology is based on ceramics, a dielectric material which has complex formulation and processing needs.

Both Murata and Erie were experts in this technology, but their market specialties differed, as did their approach to manufacturing. The Murata product line is aimed at low-cost, high-volume production to satisfy commercial markets. The Erie product line is aimed at aerospace and high-technology communication needs. The Erie catalogue offers a diverse product line subject to stringent MIL (military standards) requirements and order quantities tend to be relatively low. The two organizations are, therefore, complementary.

The success of METR in its market may be judged by steady and sustained growth over some 40 years into a company which now employs nearly 900 people and has an annual business turnover in excess of \$40 million.

By the mid to late 1970s, when many of the Canadian electronics companies of similar size were forced out of business, METR maintained its momentum by concentrating on what it knew best and by responding to market needs in an innovative way. This is a major reason why Murata acquired the company.

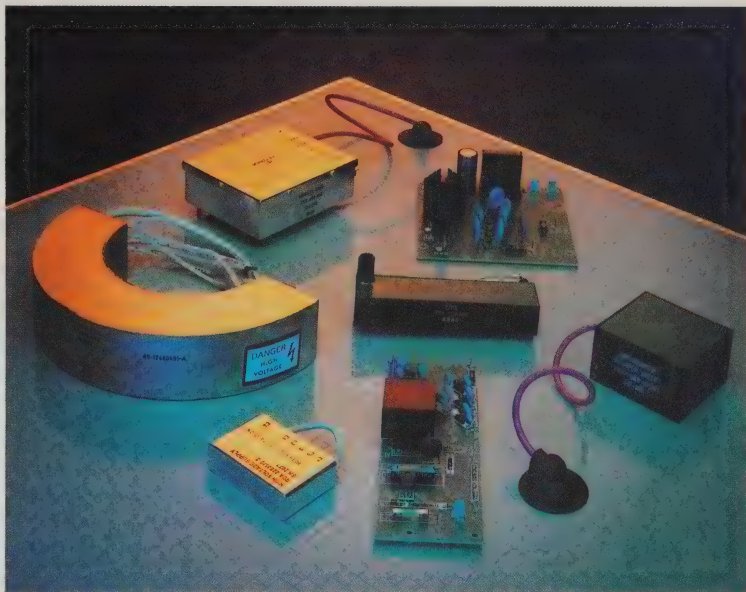
It was two years after acquiring Erie before Murata Manufacturing began encouraging the major management changes needed to develop the business. Peter Briscoe, who had managed a group of similar facilities for ITT in the United Kingdom, became president of Murata Erie North America Ltd. and several other staff changes were made.

The management team was made up of some of the original Erie management, several managers promoted from within the company plus new members. All areas of the company then came under scrutiny, from customer service to shipping.

The emphasis everywhere was on quality: quality of systems, quality of environment, qual-

ity of product, quality of service and quality of people. Timeliness, however, was not discarded. On the contrary, a new sense of urgency and responsibility was created to produce effective and lasting results. The effect of planned change can be seen throughout the company.

## Typical high-voltage power supplies from Murata Erie.



Japanese managers spend a lot of time investigating, consulting, planning and revising before acting. But, when action comes, it is swift and effective.





**"...New processes or product ideas suggested by any company employee are dissected at a brainstorming session."**

- Paperwork operation, monitoring and control systems have been streamlined to provide better control and more information. Computers have been used as tools in this improvement. The changes were based on the needs of the business and the way people really work, rather than on an abstract understanding of what computers do.
- A full-scale upgrade of the total facility is about 70 percent complete and provides a clean, pleasant and high-tech environment in which to manufacture precision products capable of high performance. A clean room area was part of this upgrade so that ceramic components could be produced free of airborne contamination.
- Upgrading the facility was matched by a re-equipment program to ensure that work stations and process equipment were of the highest quality and reliability possible.
- New product designs and new process methods were developed to further improve quality and productivity.
- A training facility was built and a personnel training program initiated at all levels.

A major factor in the company's success has been the application of Murata Erie's own knowledge of its product, its market, its technology and its people. Ability and experience combine to seek simple solutions to complex problems. The magic words "robotics" or "automation" are seldom heard and the use of consultant "experts" has been deliberately avoided.

While robotics, automation, computers and experts have their place, the more diverse the product and the smaller the production run, the more difficult it is to justify their implementation.

Murata's Japanese plants use all these tools and are highly competitive in their chosen markets. Very efficient and reliable machines routinely turn out 360 finished components per minute, 24 hours a day. If it were possible to adapt METR's product to this approach, the entire market production would be satisfied in two months by one machine with scarcely any human input.

The approach to quality and productivity at Trenton has been to develop product designs that can be manufactured by controlled processes. Equipment used for manufacture is designed to be efficient, yet flexible. User-friendly equipment is based on modular components and process data are handled by simple micro-computer systems. Since the product processes demand human intervention at some stage in their use, machines are used only for those parts of the process which benefit from their precision. Simple tooling aids are used elsewhere.

Flexibility is achieved, along with productivity, by processing from 10 to 100 or more parts at one time by means of "matrix" tooling. Supervisors and support personnel are encouraged to contribute and comment on new equipment to attain a satisfactory interaction of person with machine.



All operators are responsible for achieving and maintaining a quality standard and are reminded of this by a display of "quality highlights" at their work stations.

New processes or product ideas suggested by any company employee are dissected at a brainstorming session from which a feasibility study is commissioned. If the study is favourable, research and development work is undertaken. Every R&D project is reviewed each day by senior management to ensure that projects do not stagnate when problems occur, and that proper resources are provided.

With successful completion of R&D, the project moves to the new process group where the equipment and methods to be used in production are commissioned, operator training occurs and the run-up to "zero-defects" implemented. Reviews here are weekly.

Before a new product process or major improvement is transferred to full production control, strict criteria must be met.

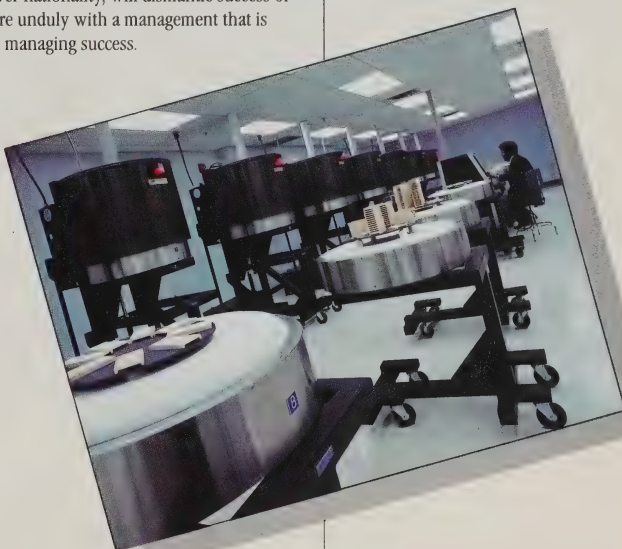
- First-time yield must be a minimum of 99.5 percent with "zero-defects" being attainable.
- Productivity targets must be met.
- All known problems must be solved.
- Equipment must have demonstrated 1000 hours minimum MTBF (mean time between failures) and less than half-hour average MTTR (mean time to repair).

Even though a speedy, large injection of capital enabled the pace of improvement to be rapid, the main contribution has been the application of available talent – using brain power to solve problems.

Automation is used, although in a limited way with computers and CAD systems, but is never substituted for human thought processes. Talent is actively sought and developed at all levels in the company. The production controller is a former data-entry clerk; one of the process managers used to be a line technician. There are many examples of this to be found in all departments.

Many Canadian companies could shed the spectre of foreign competition and the trauma of poor productivity by depending less on outside agencies and more on the application of their own strengths. However, this will only work if management is fully committed to improvement and works as a coherent team. No owner, of whatever nationality, will dismantle success or interfere unduly with a management that is clearly managing success.

## **Murata Erie's capacitor production unit in a clean room.**





# "Salad Technology" by Greens Alive

Perfect salad greens  
approaching the harvest.



**H**AVE you ever bought a head of lettuce with a warning on the package *not* to wash it? Thanks to the innovative spirit of inventor Helmut Julinot, president of Greens Alive of Aurora, Ontario, you now have the opportunity.

Growing plants without pesticides, herbicides, fumigants, dirt and insects, the firm's greenhouse structures and hydroponic growing systems are energy efficient and highly productive, and the technology is transferable.

Research and development of the Greens Alive system started in 1973 as the energy crisis loomed on the horizon and fuel costs became, and remain, the major expense in year-round greenhouse operations. Agriculture Canada reported that, in 1983, the cost of heating a Canadian greenhouse was \$20 per square metre, per year, typically devouring 30 to 50 percent of the sales dollar.

In contrast, the heating cost of a Greens Alive greenhouse in the 1985-1986 season in Canada was \$2.84 per square metre, per year! This reduction, combined with a far higher productivity per square metre, resulted in heating costs of only 1.6 percent of sales revenue.

The Greens Alive growing system increases productivity by raising the growth rate and final plant weight through the use of computer-optimized nutrient formulations, hypertonic feeding, supplementary lighting and articulated shading and energy curtain systems, all under automatic environmental control.

The lettuce plants speed from seed to salad in eight weeks. Each week, all year long, seeds are planted and lettuce heads are harvested. On a walk through the greenhouse, visitors can see eight crops of lettuce at different stages of growth.

Ninety percent of all the work in a Greens Alive greenhouse is directly productive and takes place at the three work stations – seeding, transferring and harvesting. The salad greens are seeded at one end of the greenhouse and move through it on plant conveyors to be harvested at the other end.

Greens Alive increases its operators' efficiency and productivity by providing powered plant conveyors, automatic wash tanks, fixed work stations, proprietary plant containers and a rationalized packaging system.

As Julinot puts it: "A modern greenhouse needs to be more than a plot of land with a roof over it."

Only two days a week are there more than three people in the greenhouse. On Mondays and Thursdays, a crew of four comes in to set up supplies and boxes. A switch is flipped to have the conveyor deliver the salad greens for harvesting at a convenient waist-high level.

In seven hours, the harvesting is finished and 300 cases of lettuce are in the truck for delivery to restaurants and greengrocers.

There need be no rush to eat the lettuce because it is still alive and growing in its distinctive package. It has been harvested with roots on and given a squirt of nutrient as a "box lunch for the road" to keep it crisp and fresh for at least 10 days.

The Greens Alive greenhouse and operating system is a combination of high-tech hardware, sophisticated software, an extensive set of specification manuals and ongoing operational support.

Thirty years ago, such an installation would have been provided to the customer as an outright purchase-and-sale. Today, the greatest fear of purchasers of sophisticated production equipment is being left to fend for themselves after the deal has been made.

Based on 21 years of success in franchise systems, Stephen MacKneson, Greens Alive chairman, is convinced that the vehicle of licensing, usually called franchising, is the one best suited to transferring this innovative technology to customers on an ongoing basis.

"A turn-key package from Greens Alive provides almost instant expertise in site selection, layout, operations, growing, hiring and training, purchasing, promotion, marketing and administration," says MacKneson.

Innovation in the age-old field of food growing, achieved by removing the hit-or-miss uncertainties of weather, insects and diseases, now comes as a transferable package of technology, bringing food production with high productivity and low energy consumption to all corners of the world.

For further information, contact: Greens Alive Inc., P.O. Box 366, Aurora, Ontario L4G 3L5  
Tel: (416) 773-6021

Harvesting takes place twice weekly  
at the end of the conveyors.





# Saskatchewan Research Council

## Reshaping technology for the needs of small manufacturers

The program goes beyond the typical demonstration facility by placing CAD/CAM technology in the hands of end users.

The Saskatchewan Research Council is taking CAD/CAM technologies to the shop.

**W**HEN small manufacturers look beyond local markets or want to expand product lines, they face increased technical demands and higher levels of marketplace competition. Some of Saskatchewan's small, short-line manufacturers, operating in rural and small urban locations, are now trying new methods of product design with the help of an innovative technology transfer program at the Saskatchewan Research Council (SRC).

SRC's CAD/CAM Robotics Centre functions as a "technology centre without walls" by placing CAD/CAM design stations in a client's plant and using telecommunication links to Saskatoon for access to a library of CAD/CAM applications programs and to technical support.

The program goes beyond the typical demonstration facility by placing CAD/CAM technology in the hands of end users. Manufacturers apply it to their own design and production problems, making gains in efficiency and losing little time in system start-up.

Companies participating in the program lease CAD/CAM hardware from SRC and receive technical advice from the centre's engineering staff.

Saskatchewan manufacturers in the program are using CAD/CAM in a variety of ways.

They are designing new products and components, modifying existing ones and producing drawings both for production staff and for clients.

Throughout the process and before building a prototype, the product can be stress-tested with finite element analysis and visualized with solids modelling.

Design engineers can explore an array of "what if?" questions efficiently and produce line-plots and three-dimensional modelled drawings of various options. This capability has helped several explore new product designs or modifications in focus-group marketing ventures.

The focus groups, composed of management, designers and a cross-section of customer end users, can identify useful product innovations with the help of outputs from the CAD/CAM design stage.

Computer technologies available through the CAD/CAM Robotics Centre are not limited to design but can be integrated into the manufacturing process as well.

An SRC pilot project in material requirements planning has helped a small company manage its parts inventory effectively. Costs have been reduced, stock outages minimized and management can now plan future production with a forward-looking inventory record.

The ability to integrate a variety of CAD/CAM functions into one system is an essential element in the centre's service to clients. More than 100 applications packages are available to allow individual manufacturers with a wide spectrum of products to tap into the system.

Saskatchewan's manufacturing profile shows that most operations are small to medium-sized and many (typically farm implement manufacturers) are located in rural communities, away from major centres. These businesses are eager to take their products to a wider market and view

CAD/CAM technologies as keys to remaining competitive.

In the past, high capital costs and lack of trained operators held many companies back. The CAD/CAM Robotics Centre recognizes both problems and adopts a dual strategy of educating potential users and making the required equipment readily available on a subsidized lease basis.

Management and labour are encouraged to examine the implications of the new technologies and develop applications that are specific to their own manufacturing process.

To speed the introduction of CAD/CAM, hands-

on training is provided for design engineers and plant operators. Partial funding for training programs is provided by the Canada Employment and Immigration Commission.

With design stations installed and running, a company can turn to the staff at the centre for ongoing technical support and advice.

With the help of SRC's CAD/CAM Robotics Centre, Saskatchewan manufacturers are discovering the potential of integrating computers in all phases of product development and production. Their gains are already evident - new and better products going to expanding markets.

Don Florizone, of SRC's CAD/CAM Robotics Centre, operates a design station to draw, modify and test machine components and entire products.





# Innovative Problem-Solving at the Saskatchewan Research Council

**F**OR almost 40 years, innovation has been an essential ingredient in the work of the Saskatchewan Research Council (SRC).

The key goal hasn't changed – applying good ideas to Saskatchewan's resources and products.

In 1937 and 1947, acts of the Saskatchewan Legislature first created and then reactivated the Saskatchewan Research Council. Entirely government-funded in the early years, SRC functioned as a granting agency for applied research in the province until 1958 when it moved to a new building on the University of Saskatchewan campus in Saskatoon.

SRC started its own research program and contracted its expertise to industry and government. The original facility housed laboratories, pilot plants and offices for research in chemistry, engineering, geology, industrial services and physics.

Now SRC has major facilities in Saskatoon and Regina and conducts field operations throughout the province. In 1985, SRC centralized its operations in Saskatoon's Innovation Place Research Park, reflecting its role as a key player in the province's technology community.

In addition to the new Innovation Place headquarters, the council operates a world-class slurry pipeline centre for solids transportation research and an aquaculture research laboratory, both in Saskatoon.

In Regina, the SRC Petroleum Division works with industry on enhanced recovery and upgrading of all provincial oil resources, particularly

heavy oil. A Regina field services office extends the National Research Council's Industrial Research Assistance Program (IRAP) to southern Saskatchewan.

SRC's staff of 210 includes 90 scientists and engineers with a mandate of "applying science and technology for Saskatchewan's development" within a framework of four client-oriented branches.

The Research and Development Branch works with the resources and environment of the province. Programs cover air, water and land resources related to industrial activity. All economic minerals development, including uranium, potash, gold, coal, clays and heavy oil, benefit from branch research and technical support.

The Technology Transfer Branch has programs to aid Saskatchewan business and manufacturing sectors, including product development, management consulting and innovation programs to guide entrepreneurs through all phases of new product start-up. The branch operates the CAD/CAM Robotics Centre and delivers the National Research Council's Industrial Research Assistance Program.

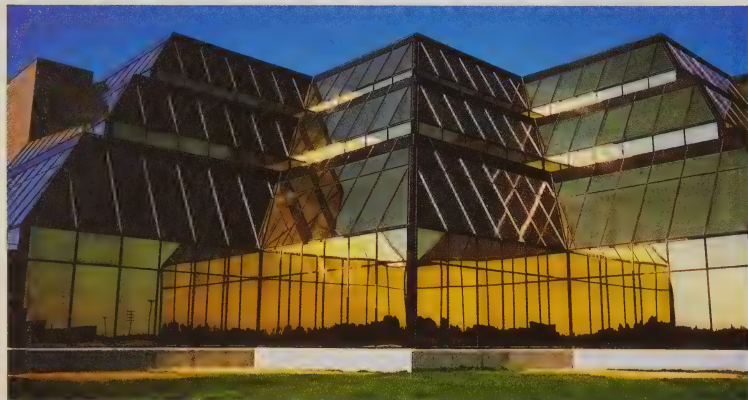
The Administration and Finance Branch provides internal services to SRC programs and operates analytical laboratories that process resource, environmental and archaeological samples. A Slowpoke nuclear reactor (one of seven in Canada) handles neutron activation analyses for western Canadian mineral resources clients.

The Canadian Centre for Advanced Instrumentation (CCAI) is the fourth SRC branch. An electronics group and a precision instruments group design, manufacture, test and calibrate measurement and control equipment for national and international markets.

SRC builds innovation into the research process in two distinct ways – by developing new technologies and unique equipment to answer real needs, and by reworking existing worldwide technologies and adapting them for maximum provincial benefit.

For further information, contact: Jim Hutch, President or Katherine Lawrence, Communications Manager, Saskatchewan Research Council, 15 Innovation Boulevard, Saskatoon, Saskatchewan S7N 2X8 Tel: (206) 933-5400

This building in Saskatoon's Innovation Place Research Park houses the Saskatchewan Research Council's headquarters. Other SRC facilities are located in Saskatoon and Regina.



## Solving problems and promoting innovation

**B.C.** RESEARCH has been in existence, in one form or another, since 1944 when the B.C. War Metals

Research Board (BCWMRB) was established to help machine shops, foundries and other metal-working industries to overcome their technical problems and meet standards and delivery deadlines.

Its main objectives were to:

- research subjects which were important to the province's industrial development;
- make research staff and facilities available to industry;
- assist in transferring existing technology to industries with limited or no technical resources of their own.

As demands for assistance became greater and more varied, the BCWMRB became the British Columbia Industrial and Scientific Research Council which, in turn, became B.C. Research.

During its 42 years, B.C. Research has grown in size and contracts as well as in expertise. Well established and highly successful, it has continued to expand into new areas and to retain people with a variety of skills while maintaining the objectives set at the time of its founding.

Seven operating areas work together, forming a self-sufficient research organization that provides technical assistance to government and industry.

These divisions include chemical technology, physical technology, extractive metallurgy, fisheries and biotechnology, environment and health, operations management, and business assistance.

The general areas of capability are: process development, product development, systems and operational analysis, research studies, testing, and industrial development and technology transfer.



Programs exist in areas such as alternate fuels, aquaculture, industrial chemistry, toxicology, remote sensing, bulk handling and ocean engineering.

Work is done on a fee-for-contract basis and, where work is being undertaken for small British Columbian companies, financial support is available. Ideas and innovations are screened, promoted and funded by B.C. Research.

All together, 120 people, including 80 technical staff, work together to benefit B.C.'s economy through research and development.

For further information, contact: B.C. Research, 3650 Wesbrook Mall, Vancouver, British Columbia V6S 2L2  
Tel: (604) 224-4331



# Technology Transfers

## Offered

### Canada

- Over-speed Spoilers for Vertical Axis Wind Turbines
- Magnetron Sputtering Apparatus
- Pressure Leaching of Magnesium Ores in a Chloride Medium
- Viscometer
- Electrically Erasable Non-Volatile Transistor Memory
- Bacterial Enzyme Used as Cheese Ripening Aid
- Convertible Trailer
- Ground-Working Sweep
- Wood Densification Technology
- Software Engineering
- Safety Handle for Transport Cargo Box Doors
- Pile Splice
- Edible Oil Deodorizer
- Device to Treat Deep-Sea Divers

### Australia

- Phenolic Foam Insulating Panels

### Austria

- Sheet Metal-Working Machines
- Electric Floor Heating

### Britain

- Sailboats

### Czechoslovakia

- Tubular Convective Heat Recuperators

### East Germany

- Surface Stabilizer
- Utilization of Waste-Water Heat
- Recovery of Copper and Aluminum

## France

- Motorcycle Wheel Alignment Check
- Modular Dehydrator for Fruits and Vegetables
- Fracture Simulator
- Integral Acoustic Guitar
- Composite Panels
- Concrete Anchoring Systems
- Temporary Shelters
- Disposable Bib
- Concrete Pipe
- Concrete Bucket

## India

- Pesticides

## Ireland

- Security Products

## Israel

- Computer Numerical Control

## Sweden

- Tire Recycling

## Switzerland

- Pressure-Measuring Sets
- One-Person Submarine

## U.S.A.

- Comparator for Automatic Curve Tracers
- Portable Composite I-Section Ultrasonic Inspection System
- Universal Hinge-Latch
- Precision Wire Stripper for Large-Gauge Wire
- Hand-Held Power Stripper
- Safe-Cutting Hand Knife
- Speed Drives
- Closet Door Hardware
- Manufacturing Inspection Systems
- Multi-Purpose Hand Rail

## West Germany

- Handles and Closures
- Koster Glass System

## Requested

### Canada

- New Plastic Technologies
- Computer Software

### Asia and Pacific

- Food Processing
- Disposable Hospital Supplies
- Rear-View Mirrors
- Heaters and Cathodes
- Condiments

### Brazil

- Miscellaneous Technologies

### India

- Diapers and Allied Products
- Electronic Circuit Breakers

### West Germany

- Environmental Protection

## Canada

### Over-speed Spoilers for Vertical Axis Wind Turbines 6039

Over-speeding of the rotors of vertical axis wind turbines in high winds often results in damage to the turbine. These light, simple, automatic spoilers will eliminate over-speeding and will not adversely affect the operation of the turbine airfoil sections at normal wind speeds.

### Magnetron Sputtering Apparatus 7411

A composite cathode target for use in magnetron sputtering which permits simultaneous sputtering of several different materials in any desired ratios. The ratios are determined by the relative areas of the different materials of which the cathode target is composed. Hard-to-fabricate alloys such as Ni-Cr are easily produced with this cathode target.

### Pressure Leaching of Magnesium Ores in a Chloride Medium 7826

This process presents an alternative leaching method for the recovery of uranium and small amounts of radionuclides, particularly radium, in the ore. An acidic solution of an alkaline earth metal chloride is used under oxygen pressure. Sulphate ion build-up is controlled to improve the extraction of the radionuclides. Recovery efficiency averages over 95 percent for uranium and over 90 percent for the radionuclides. The tailings are environmentally inert and suitable for backfill.

### Viscometer 8141

This instrument is a modification of the Cannon-Fenske type capillary viscometer, specially designed for measuring the viscosity of volatile or radio-active liquids. The sample liquid is timed as it passes through the capillary, protected by vacuum to prevent contamination by air.

### Electrically Erasable Non-Volatile Transistor Memory 8483

In this design of electrically erasable non-volatile transistor memory, an insulating layer of ferro-electric material replaces a double layer of dielectric material resulting in a simpler and easier to

fabricate storage structure. Information is stored and erased by polarizing and de-polarizing the storage structure. This memory offers high-density storage and is compatible with planar technologies.

### Bacterial Enzyme Used as Cheese Ripening Aid 8305

This invention concerns the production of Cheddar cheese using an improved ripening aid which reduces aging time while enhancing the development of desirable flavour and texture characteristics.

*For any of the offers listed above, write to:*  
Canada Patents and Development Ltd.,  
275 Slater Street, Ottawa, Ontario K1A 0R3;  
Telephone: (613) 990-6100.

*Please quote the appropriate case number.*

### Convertible Trailer

A Canadian company wishes to enter into a licensing agreement with an interested party for the manufacture of its "Bulktrailer". The main feature of this trailer is that it can be converted within minutes from a dry bulk load carrier to a flat-bed, general freight trailer, or vice-versa.

*Write to:* C. Neumann, D.N.A. Systems Inc.,  
67 Lakeshore Road, Pointe-Claire, Quebec  
H9S 4H5; Telephone: (514) 695-3382;  
Telex: 055-62171.

### Ground-Working Sweep

A Canadian inventor is offering to companies in the agricultural or machinery industries, under licence, the manufacturing and marketing rights for his patented invention, a cultivator sweep. The inventor claims that his design eliminates the problems of using a conventional sweep. Additional benefits include durability, versatility and overall effectiveness as sweep or shovel.

*Write to:* Gerald J. Anderson, P.O. Box 1317,  
Melville, Saskatchewan S0A 0P0;  
Telephone: (306) 728-3506.

### Wood Densification Technology

A Canadian inventor offers licensing of his patented technology for a mechanical/chemical method to convert low-quality, low-density

woods into high-quality, high-density hard woods. With the same method and without any additional cost, wood can be bent, formed or deeply embossed to produce moulding, curved furniture pieces, etc.

*Write to:* P. Favot, Renova Manufacturing Co.  
Ltd., 170 Booth Street, Ottawa, Ontario K1R 7W1;  
Telephone: (613) 234-8169; Telex: 053-4834.

### Software Engineering

A Canadian firm is offering to other Canadian companies, through licence or joint venture, technology relating to computer software consisting of two packages - the developer and the documenter - both designed to assist systems analysts, designers and product managers in production.

*Write to:* Asyst Technologies Inc., 1080 Beaver Hall Hill, Suite 1400, Montréal, Quebec H2Z 1S8;  
Telephone: (514) 871-0108.

### Safety Handle for Transport Cargo Box Doors

A Canadian company is offering, through a licensing or joint-venture agreement, its technology "Load Guard", a handle improvement which can be added to all cargo boxes with rotatable locking bars, or installed during manufacture. Once installed, it is impossible to open or close trailer doors without using the Load Guard handle.

*Write to:* E. Haist, Load Guard Registered,  
P.O. Box 299, Maitland, Ontario K0E 1P0;  
Telephone: (613) 348-3398 or 348-3579.

### Pile Splice

A Canadian company wishes to enter into a joint-venture agreement or to license its technology "Sure Lock" mechanical pile splice. The pile splice consists of male-female plates which lock after they are brought together with no welding necessary. The company claims many advantages including: concrete piles of different sizes and shapes can be spliced together; equipment of smaller capacity can be used to drive deep piles by using shorter piles with "Sure Lock".

*Write to:* Brian Cebryk, Agra Industries Ltd.,  
1200 CN Towers, Saskatoon, Saskatchewan  
S7K 1J5; Telephone: (306) 653-5163;  
Telex: 074-2496.



### **Edible Oil Deodorizer**

A Canadian company is seeking a licensing or joint-venture agreement with other Canadian firms for its "Campro" edible oil deodorizer. It is claimed to be a unique concept in vacuum steam stripping technology featuring external de-aeration for greater flexibility and economy in handling both wet oils and those requiring gentle handling.

*Write to:* Brian Cebryk, Agra Industries Ltd., 1200 CN Towers, Saskatoon, Saskatchewan S7K 1J5; Telephone: (306) 653-5163; Telex: 074-2496.

### **Device to Treat Deep-Sea Divers**

A Canadian inventor is offering to companies, through a licensing agreement, the manufacturing and marketing rights to his portable device used in treating deep-sea divers who have surfaced too quickly. The inventor claims many advantages including low cost, ease of use, quick results and no requirement for medical attendance.

*Write to:* Silvain Desjardins, Université de Sherbrooke, Sherbrooke, Quebec J1K 2R1; Telephone: (819) 821-7840.

## **Australia**

### **Phenolic Foam Insulating Panels**

An Australian company is offering to a Canadian firm, under licence, the rights to manufacture in Canada its phenolic foam insulating panels, suitable for use in ceilings, exterior or interior walls, office partitioning, temporary buildings and boat or ship walls.

*Write to:* Senior Trade Commissioner, Australian Trade Commission, P.O. Box 69, Commerce Court Postal Station, Toronto, Ontario M5L 1B9; Telephone: (416) 367-0783; Telex: 06-21962.

## **Austria**

### **Sheet Metal-Working Machines**

An Austrian firm is seeking a licensing agreement with a Canadian company for the production of sheet metal-working machines.

*Write to:* Kagerer Gesellschaft MBH, Ignaz Mayer-Strasse 7, 4020 Linz, Austria; Telephone: (0732) 27.44.71; Telex: (61) 37.32.91.

### **Electric Floor Heating**

An Austrian firm is offering to Canadian companies, through a licensing agreement, its technology related to mobile electric floor heating. The firm claims it is a new kind of floor heating which is not built-in but is laid on existing floors. It consists of reinforced plates with electrical connections controlled by a standard room thermostat. This system is claimed to have many advantages, including fast and simple installation, high economy, high efficiency, quick control response and portability.

*Write to:* J. Windisch, Jowitherm-Herzelemente, A-8793 Trofaich, Austria.

## **Britain**

### **Sailboats**

A British company wishes to enter into a licensing agreement with a Canadian company for the manufacturing and marketing rights of its sail-



boats. One is a small, lightweight, multi-hull sailboat claimed to have low structural stresses in waves and in planing, and capable of being converted to land and ice sailing. The second type is a large and lightweight, multi-hull sailing yacht which can be converted into a power boat.

*Write to:* F. N. Potter, The Willow, 116 Main Street, Burton Joyce, Nottingham, NG14 5EP, England; Telephone: 0602.31.3115

## **Czechoslovakia**

### **Tubular Convective Heat Recuperators**

A Czechoslovakian trading corporation offers to Canadian companies, through a licensing agreement, the technology for tubular convective heat recuperators intended for reheating furnaces to recover heat from combustion of gases or fumes. The main application is for continuous reheating of furnaces of all types used in the iron and steel industries.

*Write to:* Polytechna Foreign Trade Corporation, Technical Cooperation Agency, Panska 9, POB 834, CS-11245 Praha 1, Czechoslovakia; Telephone: 244941; Telex: 121585.

## **East Germany**

### **Surface Stabilizer**

An East German company seeks Canadian companies interested in manufacturing, through licence or joint venture, its stabilizer "Floormax". This is a chemical concentrate designed to stabilize any kind of soil, particularly for roadmaking. It is claimed that the treated soil becomes water-resistant. It is non-toxic and easy to use.

*Write to:* Bank für Arbeit und Wirtschaft, Aktiengesellschaft, Filiale Worgl, Innsbrucker Strasse 2, Worgl, East Germany.

### **Utilization of Waste-Water Heat**

An East German firm is offering Canadian firms, through licensing, technology for a flexible absorber system for the utilization of waste-water heat. The system is well suited to waste heat recovery from sewage and industrial wastes.

*Write to:* Ogilvie Taylor & Associates Inc., 355 Southend Avenue, Suite 25L, New York, N.Y.; Telephone: (212) 912-0986.

### Recovery of Copper and Aluminum

An East German firm is offering to Canadian companies, through a licensing agreement, the know-how for a highly productive method for the recovery of copper and aluminum from plastic-insulated and rubber-insulated waste cable, after pre-treatment by means of refrigeration engineering.

*Write to:* Ogilvie Taylor & Associates Inc., 355 Southend Avenue, Suite 25L, New York, N.Y.; Telephone: (212) 912-0986.

### France

#### Motorcycle Wheel Alignment Check

A French company is offering Canadian firms, under licence, its technology for a device that can be used to determine the proper alignment of wheels without having to dismantle them. The company claims that only eight minutes are required to analyse and make the necessary corrections.

*Write to:* Établissements Duchene, 92, rue Edouard Vaillant, 92300 Levallois, France.

#### Modular Dehydrator for Fruits and Vegetables

A French firm is offering to Canadian companies, through a licensing agreement, its technology for a new dehydrator which combines great processing speed and maximum preservation of nutritional qualities. It is claimed that this dehydrator can process four tons of fresh produce an hour while preserving vitamins A and B, natural colours and flavours.

*Write to:* Monsieur Fiamma, Établissement NEU, 70, rue du Collège, 59700 Marqu'en-Bareuil, France.

#### Fracture Simulator

A French inventor is offering Canadian companies, for manufacture under licence, a device for simulating fractures of bones in the upper and lower limbs. The device simulates fractures with or without deformation and is intended to be used in teaching how to set fractures painlessly.

*Write to:* Mr. Augier, 168, avenue du Général de Gaulle, 38290 La Verpillière, France; Telephone: 74.94.19.40.



#### Integral Acoustic Guitar

A French inventor is offering Canadian companies, under a licensing agreement, the rights to manufacture his electric guitars which have no structural discontinuity between the arm and the sound box. It is claimed that the uniquely designed guitar can be manufactured more easily and at lower cost than classic or other conventional models.

*Write to:* J. P. Gallo, 4, Impasse de la Monnaie, 46100 Figeac, France; Telephone: 65.34.64.37.

#### Composite Panels

A French manufacturer is offering to Canadian companies, through a licensing agreement, the know-how to manufacture large-sized glass reinforced panels in laminated polyester, used in containers, road transport and the construction industry. The panels are claimed to be of high mechanical strength, to have high thermal and sound absorbing characteristics and to have an aesthetic appearance.

*Write to:* M. Boulanger, S.N.E. Polyfont, "Le Point du Jour", Hoymille, 59380 Bergues, France; Telephone: 28.68.60.65; Telex: 160911F.

#### Concrete Anchoring Systems

A French firm is offering Canadian companies, through a licensing agreement, a system to anchor rails in concrete. It is made of thermoplastic material covered by two metallic half-shells. Among the advantages claimed are superior strength, ability to withstand variations of temperature from -25° to 85° Celsius, economy, simplicity and vibration resistance.

*Write to:* M. Vanotti, VAPÉ, B.P. 1002, 01101, Oyonnax Cedex, France; Telephone: (33) 74.77.34.66

#### Temporary Shelters

A French company is offering to Canadians, under a licensing agreement, technology required to construct "Dinka" shelters, inflatable structures made of polyester canvas impregnated with plastic and pressurized. Bags of water hold the shelter firmly on the ground. Circular shelters of up to 40 m (130 ft.) diameter can be erected in less than a day. Other shapes are available.

*Write to:* SNC Lantermoz-Pitance, 28, rue Pierre Copel, 42031 Saint-Etienne Cedex, France; Telephone: (33) 77.57.22.67.

#### Disposable Bib

A French firm is offering to Canadian companies, through a licensing or joint-venture agreement, its technology related to a disposable bib which covers the whole front of the child, its arms and half of its back. The bib consists of a sheet of paper with a perforated hole for the head and cuts for the arms, which are fastened under the wrists. It is claimed to be supple, soft to the touch and waterproof.

*Write to:* Mme Isabelle Bondenet, Société Kester, 36, rue de Picpus, 75012 Paris, France; Telephone: 43.07.05.46.

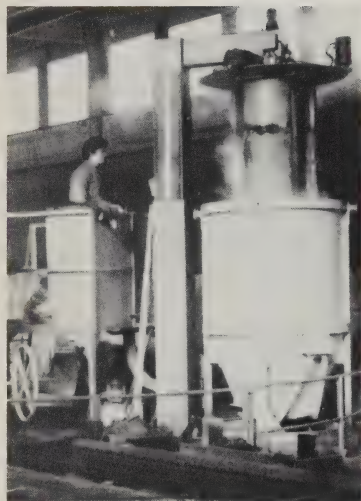


#### Concrete Pipe

A French company is offering Canadian companies a licence to produce pipes for the construction of passageways under embankments, water conduits and the like. These pipes are assembled in longitudinal prefabricated segments. The firm claims that the pipes are water-tight and air-tight and cost less than concrete poured on site.

*Write to:* Matière, 10, avenue Franklin Roosevelt, 75008 Paris, France; Telephone: (1) 43.59.37.20





#### Concrete Bucket

A French company is offering Canadian manufacturers, through a licensing agreement, the right to manufacture and market its innovative concrete bucket that uses electric conduction to heat its contents directly. It is claimed that this procedure offers energy savings of up to 60 percent. It is also claimed that it reduces by 60 percent the time needed to solidify a batch of concrete.

*Write to:* Jacques Beauvils, Beau Fils s.a., 37, rue d'Audincourt (Dasle), 25230 Selon Court, France; Telephone: (33) 81.34.56.24.

#### India

##### Pesticides

An Indian firm is offering Canadian companies, through joint-venture, technology for the manufacture of high-grade pesticides such as methyl parathion, quinalphos, phorate, zineb, monocrotophos and fenvalerate.

*Write to:* Aimco Pesticides, Akhand Jyoti, 8th Road, P.O. Box 16806, Santacruz (East), Bombay, 400-055, India.

#### Ireland

##### Security Products

An Irish firm is offering Canadian companies, through a licensing agreement, technology for security products.

The first, an anti-intruder barrier, is designed to be installed on top of a wall or fence. It is fabricated of two sheets of expanded steel threaded on a thimble, mounted on brackets fixed to a wall or fence. The revolving unit prevents a stable hand or foot hold.

The second product is a zig-zag security fence that requires no nuts, bolts, clamps or concrete posts, only gate posts when necessary. It consists of pre-formed vanes that are placed in a vertical position in a half-metre trench and employs a unique joiner. The firm claims advantages of high impact resistance, fast, easy installation, low cost and great strength.

*Write to:* Michael P. McCowan, MNJ Engineering, 80 Baggot Lane, Dublin 4, Ireland; Telephone: 604883.

#### Israel

##### Computer Numerical Control

An Israeli firm, specializing in computer numerical control, offers a Canadian company in the field a marketing agreement leading to joint venture for its products. Its Numericon 850 is claimed to have unique features, including storage and retrieval of up to 30 programs on one cassette; a CRT terminal for display of stored programs for easy editing and programming; 12K RAM memory; 40K of eeprom memory and a manual panel with manual/auto buttons.

The firm claims its second product, a mini-computer-based, multi-axes CNC control unit, ELEX LX 140 IQ, will compute, power and control CNC machines using the latest state-of-the-art technology.

*Write to:* Yair Eilam, Conlog Control, 102 Jabotinsky Street, Petach Tikva 49517, Israel.

#### Sweden

##### Tire Recycling

A Swedish firm is offering Canadian companies,

through licensing agreement, a method of recycling ground-up, worn-out tires. Uses to date of the resultant hard rubber sheets include mechanical protection, stroke compression, electrical insulation and noise suppression.

*Write to:* Ernest Weingarten, We Konsult KB, Oxbarsvagen 1, 43400 Kungshäcka, Sweden.

#### Switzerland

##### Pressure-Measuring Sets

A Swiss company offers a Canadian company, under licence, the manufacturing and marketing rights for Canada and the United States for various pressure-measuring sets for liquid and gaseous mediums. The instruments can be used either as calibrators or as measuring devices for tests or adjustments of pneumatic components, apparatus and control systems, or as field maintenance instruments.

*Write to:* E. L. Hoffer, Rietwiesstrasse, CH8810 Horgen, Switzerland; Telephone (01) 725-43-90; Telex: 429-520-SFGO-CH.

##### One-Person Submarine

A Swiss manufacturer of various one- and two-person submarines, offers a Canadian company, under licence, the manufacturing and marketing rights for Canada and non-exclusive rights for the rest of the world, of its one-person submarine. The craft, designed primarily for naval use, is suitable for scientific use, observations, underwater work, coast guards and rescue work on sunken aircraft and ships, as well as for naval applications.

*Write to:* E. L. Hoffer, Rietwiesstrasse, CH8810 Horgen, Switzerland; Telephone: (01) 725-43-90; Telex: 429-520-SFGO-CH.

#### U.S.A.

##### Comparator for Automatic Curve Tracers

This device is a plug-in adaptor to a circuit tracer for comparing signals between a reference integrated circuit board (IC) and a suspect IC. The signal of the suspect IC is displayed on the curve tracer as an overlay on the reference IC signal.

Automatic switching and selection of comparable

pin combinations is possible for multi-pin devices. It is claimed that this device eliminates the inconvenience of manually making the connections, and significantly speeds up the evaluation process.

#### **Portable Composite I-Section Ultrasonic Inspection System**

A hand-operated, eight-channel through-transmission system that is capable of identifying flaws in composite I-sections, this device consists of a single-channel ultrasonic instrument within a multi-scanner and multiplexer, a scanning fixture and associated cables, water lines and readout. Flaws are indicated by the flashing LEDs (light emitting diodes) for each channel. The advantages of this system are its relatively low cost, reliability and versatility.

#### **Universal Hinge-Latch**

Designed for use in confined areas of pleasure boats, automobiles and aircraft, this unique device functions as a hinge which can be changed easily to function as a latch by moving a spring-loaded latch activator.

#### **Precision Wire Stripper for Large-Gauge Wire**

Hand-operated wire stripper cuts and removes insulation from large-gauge wire without nicking, scratching or scraping. It contains a micro-adjustment for the blade, permitting use on a wide variety of wire sizes and insulation types. It is capable of stripping wires from 12 to 0000 gauge.



#### **Hand-Held Power Stripper**

This lightweight power stripper is easily held in one hand while wire is inserted into the funnel guide for stripping. By depressing and releasing, the insulation is stripped and ejected in approximately two seconds. The unit is reliable and easily maintained, can be operated with air pressures as low as 3 kg/cm<sup>2</sup> (40 psi) and is adaptable to electrical or hand modes.

#### **Safe-Cutting Hand Knife**

This industrial-use hand knife solves the very real problem of frequent injuries when sharp knives are required in production situations. It is claimed that injury from inadvertent cutting has been virtually eliminated in the fabrication and build-up of honeycomb core parts without affecting production rates.

*For further information on the above devices, write to:*

Boeing Associated Products, Mail Stop 7E-14, P.O. Box 3707, Seattle, Washington 98124-2207; Telephone: (206) 828-2440.

#### **Speed Drives**

An American company is offering Canadian companies, through a licensing agreement, its technology covering mechanical and electrical, adjustable and fixed-speed drives. The company supplies drawings and technical specifications.

*Write to:* Ken Ingalls, Graham Company, 8800 West Bradley Road, Milwaukee WI 53224; Telephone: (414) 355-8800.

#### **Closet Door Hardware**

An American company is offering, under a licensing or joint-venture agreement, manufacturing rights for a wide range of closet door hardware for bi-fold, pocket and bypass doors.

*Write to:* R. E. Wood, Crawford Manufacturing Co. Inc., 5800 Wheaton Drive, P.O. Box 43666, Atlanta, Georgia 30336; Telephone: (404) 346-3460.

#### **Manufacturing Inspection Systems**

An American firm is looking for a Canadian company interested in becoming involved in a joint venture. The technologies offered consist of various expert systems, robot vision products and systems designed for quality inspection and inspection of welding.

*Write to:* Michael M. Bahn, Autoflex Inc., 23380 Commerce Drive, Farmington Hills, Michigan 48024; Telephone: (313) 476-3100.

#### **Multi-Purpose Hand Rail**

An American company is offering, through a licensing agreement or outright sale of patent, its technology for a multi-purpose hand rail. The firm claims the rail can be used in many different applications including in recreational vehicles (RVs) and homes.

*Write to:* Wiebe Industries, 90 Donald Drive, Hollister, California 95023; Telephone: (408) 637-3715.

#### **West Germany**

##### **Handles and Closures**

A West German firm is offering Canadian companies, through a licensing agreement, its methods of manufacturing handles, closure rings and press-it closures for use on barrels and drums. The technique of combining steel and plastic and the tools necessary for production forms an essential part of the offer.

*Write to:* Dr. Gregory, Th. Schemm Metall-und Kunststoffwarenfabrik, 5952 Attendorn, Papiermühle, West Germany; Telephone: (0.27.22) 7215; Telex: 876723.

##### **Koster Glass System**

A German inventor offers to Canadian companies, through a licensing agreement, technology for the manufacture of insulating glass. The system involves placing a sheet of reflective material between two plates of glass to allow the sun's rays to penetrate and provide heat in winter, and to deflect the rays during summer to keep room temperatures down.

*Write to:* Helmut Koster, Koster Patente und Architektur, Hallesche Strasse 21, 100 Berlin 61, West Germany; Telephone: 030/251.60.60.



# Requested

## Canada

### New Plastic Technologies

Canadian companies are seeking new technologies, through licensing or joint-venture arrangements, in the field of plastics by injection, blow-mould or roto-mould for consumer and automotive goods and electronics applications.

*Write to:* Gerald Desjardins, Industrial Commissioner, 220 Place Municipale, Cowansville, Quebec J2K 1T4; Telephone: (514) 263-0141.

### Computer Software

A Canadian firm is seeking, through joint venture or licence, technology in the computer software field on a data base management system and on-line data dictionary running on a large IBM (or IBM-compatible) computer, code generators, and fourth generation languages and prototyping techniques.

*Write to:* Asyst Technologies Inc., 1080 Beaver Hall Hill, Suite 1400; Montréal, Quebec H2Z 1S8; Telephone: (514) 871-0108.

## Asia and Pacific

### Food Processing ABI-74

A firm from the Philippines is seeking new technology, through a licensing agreement, for equipment related to processing pickles, fruits, fish and vegetables.

### Disposable Hospital Supplies CH-1

A firm from Pakistan wishes to acquire, through a licensing or joint-venture agreement, new technologies to manufacture disposable hospital supplies, more particularly dextrose/saline infusion bags.

### Rear-View Mirrors MISC-82

An Indian company is seeking, through a licensing agreement, new technology and equipment related to the manufacture of rear-view mirrors for motor bikes and cars.

### Heaters and Cathodes EE-47

An Indian company, involved in the manufacture of heaters and cathodes, seeks a joint-venture partner to supply both technology and equipment for the manufacture of 3-MN heaters and cathodes used for TV picture tubes.

### Condiments ABI-78

A firm in Thailand is seeking a licensing or joint-venture agreement with a Canadian company to acquire new technology related to the production of chili sauce, tomato ketchup, pickles, etc.

*For information on the above requests, write to:* Han-Col Kang, Asia and Pacific Centre for Transfer of Technology, 49 Palace Road, P.O. Box 115, Bangalore 560 052, India; Telephone: 76931-3. *Please quote project number.*

## Brazil

### Miscellaneous Technologies

Brazilian firms are looking for new technologies to manufacture whirlpool baths, pools, filters, pumps and pool equipment (Project 11/86); terra cotta kitchen and household articles (Project 14/86); spare parts for cars, trucks and buses (Project 15/86); electronic automating equipment (Project 20/86); and petrochemical equipment for processing industries (Project 21/86).

*Write to:* Guilherme Arroio, Embassy of Brazil, 255 Albert Street, Suite 900, Ottawa, Ontario K1P 6A9; Telephone: (613) 237-1090; Telex: 053-4222.

## India

### Diapers and Allied Products

A manufacturer of measuring tapes wishing to diversify seeks technical know-how, collaboration, machinery and equipment to produce diapers and allied products.

*Write to:* R. Nayar, National Tape Co., Ferozepore Road, Ludhiana 141 001, India.

### Electronic Circuit Breakers

A manufacturer of electronic equipment seeks a joint-venture partner with technical know-how to manufacture electronic circuit breakers. The product must consume very little power and be able to handle power up to 10 kW single-phase or three-phase 400/440 V alternating current supply.

*Write to:* Bhatt Electronics (P) Ltd., 8/1, Palmgrove Road, Bangalore 560 047, India.

## West Germany

### Environmental Protection

A West German firm is looking to acquire, through a licensing agreement, new processes in the field of environmental protection. Its main areas of interest are: air pollution control including incineration, filters, flue-gas scrubbing, wastewater treatment such as biological processes, and solid waste treatment such as gasification. All engineering and marketing capabilities are in-house.

*Write to:* Dr. W. G. Hartweck, Deutsche Filterbau GMBH, Neusser Str. 111, 4000 Dusseldorf 1, West Germany; Telephone: (021) 3028-0 (439).

# Special Events

## Summary

### U.S.A.

- Licensing Executives Society U.S.A./Canada Western Regional Meeting/Palm Springs, California – January 1987

### WEST GERMANY

- CEBIT-Computer and Communication Equipment Show/Hanover-March 1987
- Hanover Industry Fair/Hanover – April 1987

### U.S.A.

- Licensing Executives Society U.S.A./Canada Eastern Regional Meeting/Hilton Head Island, South Carolina – May 1987

### BELGIUM

- Flanders Technology International Fair Ghent – May 1987

### MALAYSIA

- Machmex '87/Kuala Lumpur – May 1987

### JAPAN

- World Conference on Advanced Materials for Innovations in Energy, Transportation and Communications/Tokyo – May 1987

### FINLAND

- Pulp Washing '87/Mariehamn – May 1987

### AUSTRALIA

- Communications '87/Melbourne – June 1987

### CANADA

- 1987 International Mechanical Pulping Conference/Vancouver – June 1987
- 6th Annual CAD/CAM, Robotics and Automation Show/Toronto – June 1987

### U.S.A.

- Licensing Executives Society U.S.A./Canada Central Regional Meeting/Brainerd, Minnesota – June 1987

### CANADA

- Exposition CAO/FAO/Montréal – September 1987
- Electronicom '87/Toronto – September 1987
- Canada's Woodworking Machinery and Supply Exhibition/Willowdale, Ontario – September/October 1987

### CANADA

- Centre for Advanced Technology Education Seminars/Toronto – Winter and Spring 1987

### Licensing Executives Society U.S.A./Canada Western Regional Meeting

Rancho Las Palmas Hotel  
Palm Springs, California  
January 30-31, 1987

*For additional information on the meeting, please write to:* Licensing Executives Society U.S.A./Canada, 1225 Elbur Avenue, Cleveland, Ohio 44107, U.S.A.  
*Tel:* (216) 226-1642

### CEBIT

#### Computer and Communication Equipment Show

Hanover Messe, Hanover  
West Germany  
March 4-11, 1987

*For additional information on CEBIT, please write to:* Susan Cooke, Worldwide Trade Fair Inc., 69 Sherbourne Street, Suite 222, Toronto, Ontario M5A 3X7  
*Tel:* (416) 364-5352

### Hanover Industry Fair

Hanover Messe, Hanover  
West Germany  
April 1-8, 1987

*For additional information on the fair, please write to:* Susan Cooke, Worldwide Trade Fair Inc., 69 Sherbourne Street, Suite 222, Toronto, Ontario M5A 3X7  
*Tel:* (416) 364-5352

### Licensing Executives Society U.S.A./Canada Eastern Regional Meeting

Hotel Inter-Continental  
Hilton Head Island, South Carolina  
May 1-2, 1987

*For additional information on the meeting, please write to:* Licensing Executives Society U.S.A./Canada, 1225 Elbur Avenue, Cleveland, Ohio 44107, U.S.A.  
*Tel:* (216) 226-1642

### Flanders Technology International Fair

Technology Transfer Center  
Exhibition Hall  
Ghent, Belgium  
May 11-17, 1987

Technology transfer exhibition focusing on products, processes, distribution systems, management techniques.

*For additional information on the exhibition, please write to:* Dr. H. Debbaut, Flanders Technology International 1987, c/o G.O.M.O.V., Floraliapaleis, bus 6, B-9000 Ghent, Belgium,  
*Tel:* (32) 91/21 55 11 *Telex:* 12666

### Machmex '87

Putra World Trade Centre  
Kuala Lumpur, Malaysia  
May 13-17, 1987

The Fourth Malaysian International Exhibition of production machinery, metal-working and engineering equipment and hardware.

*For additional information on the exhibition, please write to:* Mr. Calvin Fook, ISE Management (M) Sdn. Bhd., 3A, Jalan SS 2/8, Taman Megah, 47301, Petaling Jaya, Selangor, Malaysia  
*Tel:* 03-7749377/7741890



**World Conference on Advanced Materials for Innovations in Energy, Transportation and Communications (CHEMRAWN VI)**

Nippon Toshi Center

Tokyo, Japan

May 17-22, 1987

*For additional information on this world exhibition, please write to:* Prof. Saburo Nagatsuma, Chairman of the CHEMRAWN VI World Conference, c/o The Chemical Society of Japan, 1-5, Kanda Surugadai, Chiyoda-ku, Tokyo 101, Japan

*Telex:* 2226198 CSJ J, *Fax:* 03-292-6087

**Pulp Washing '87**

Hotel Arkipelag

Mariehamn, Åland

Finland

May 19-21, 1987

An international symposium on the fundamentals and practice of pulp washing.

*For additional information on this international symposium, please write to:* Mr. David H. Paterson, Technical Section, CPPA, Sun Life Building, 23rd Floor, 1155 Metcalfe Street, Montréal, Quebec H3B 2X9

*Tel:* (514) 866-6621, *Telex:* 055-60690

**Communications '87**

The Australian International Electronic Communications and Information Technology Exhibition.

Melbourne, Australia

June 1-4, 1987

*For additional information on the exhibition, please write to:* UNILINK, 5 Donalda Crescent, Agincourt, Ontario M1S 1N5

*Tel:* (416) 291-6359, *Telex:* 06-968027

**1987 International Mechanical Pulping Conference**

Hotel Vancouver

Vancouver, British Columbia

June 2-5, 1987

*For additional information on the conference, please write to:* Mr. W. Robert Wood, Technical Section, CPPA, Sun Life Building, 23rd Floor, 1155 Metcalfe Street, Montréal, Quebec H3B 2X9

*Tel:* (514) 866-6621, *Telex:* 055-60690

**6th Annual CAD/CAM, Robotics and Automation Show**

Skyline Hotel, Airport Road

Toronto, Ontario

June 17-18, 1987

*For additional information on the CAD/CAM show, please write to:* Shannon Kyles, 46 Hyde Park Avenue, Hamilton, Ontario L8P 4M5

*Tel:* (416) 527-4739

or

Mr. D. Christensen, Ontario Centre for Advanced Manufacturing, 190 Atwill Drive, Suite 402, Rexdale, Ontario M9W 6H8

*Tel:* (416) 675-4363

**Licensing Executives Society U.S.A./Canada**

**Central Regional Meeting**

Madden's Resort on Gull Lake

Brainerd, Minnesota

June 20-21, 1987

*For additional information on the meeting, please write to:* Licensing Executives Society U.S.A./Canada, 1225 Elbur Avenue, Cleveland, Ohio 44107, U.S.A.

*Tel:* (216) 226-1642

**Exposition CAO/FAO '87**

Palais des Congrès

Montréal, Québec

September 22-24, 1987

*For additional information on this exposition, please write to:* Sylvie St-Laurent, D'Avirro & Associé, 1440, Ste-Catherine ouest, Montréal, Québec H3G 1R8

*Tel:* (514) 879-9037

**Electronicom '87**

Metro Toronto Convention Centre

Toronto, Ontario

September 28-30, 1987

*For additional information on Electronicom '87, please write to:* Southex Exhibitions, 1450 Don Mills Road, Don Mills, Ontario M3B 2X7

*Tel:* (416) 455-6641

**Canada's Woodworking Machinery and Supply Exhibition**

Toronto International Centre

Toronto, Ontario

September 28-October 1, 1987

This exhibition will feature displays of wood-working machinery, hardware and fasteners, tooling, dust control, adhesives, lumber, mouldings, springs, saws, stain repellants and abrasives.

*For additional information, please write to:* H. F. MacGregor & Associates, 360 Consumers Road, Willowdale, Ontario M2J 1P8

*Tel:* (416) 491-9656

**Centre for Advanced Technology**

**Education Seminars**

Centre for Advanced Technology Education

Ryerson Polytechnical Institute

Toronto, Ontario

Winter and Spring 1987

*Strategic Manufacturing Management*

- Understanding Computer Integrated Manufacturing
  - January 20-22, 1987
  - March 10, 1987
- Strategic Planning for Computer Integrated Manufacturing
  - February 5-6, 1987
  - March 11-12, 1987

*Information Systems/Communications*

- Manufacturing Information Management: Fundamentals for Engineers and Manufacturers
  - February 25-26, 1987
- Fibre Optic Applications in the Manufacturing Environment
  - April 10, 1987

*Design/Analysis*

- An Introduction to CAD/CAE/CAM
  - February 10-12, 1987
- Advanced CAD/CAE/CAM
  - March 24-26, 1987
- CAD Laboratory: "Hands-On" Mainframe Lab
  - March 11, 1987
  - April 2, 1987
- Advanced Manufacturing Simulation
  - March 12-13, 1987

*Production/Automation*

- Robotics: Fundamentals
  - February 10, 1987
  - March 24, 1987
- Robotics: Applications
  - February 11-12, 1987
  - March 25-26, 1987
- Design for Robotics
  - January 27, 1987
- Flexible Automated Assembly
  - February 27, 1987
- Applied Machine Vision: An Overview of Manufacturing Applications
  - February 4, 1987
- Laser Applications for Manufacturing Productivity
  - March 31, 1987

*Production/Control Management*

- Manufacturing Resource Planning
  - February 12-13, 1987
- Just-in-time Techniques for Canadian Manufacturing
  - January 23, 1987
  - March 23, 1987

*For additional information regarding these seminars, write to:* Centre for Advanced Technology Education, Ryerson Polytechnical Institute, 350 Victoria Street, Toronto, Ontario M5B 2K3

# Regional Offices

**The Department of Regional  
Industrial Expansion maintains  
regional and local offices in each  
province for your convenience:**

## **Newfoundland**

P.O. Box 8950  
Parsons Building  
90 O'Leary Avenue  
St. John's, Newfoundland  
A1B 3R9  
Tel: (709) 772-4884

### *Local Offices:*

#### **Corner Brook**

Tel: (709) 634-4477

#### **Goose Bay, Labrador**

Tel: (709) 896-2741

## **Prince Edward Island**

P.O. Box 1115  
Confederation Court Mall  
134 Kent Street, Suite 400  
Charlottetown  
Prince Edward Island  
C1A 7M8  
Tel: (902) 566-7400

## **Nova Scotia**

P.O. Box 940, Station M  
1496 Lower Water Street  
Halifax, Nova Scotia  
B3J 2V9  
Tel: (902) 426-2018

## **New Brunswick**

P.O. Box 1210  
Assumption Place  
770 Main Street  
Moncton, New Brunswick  
E1C 8P9  
Tel: (506) 857-6400

### *Local Offices:*

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Tel: (506) 548-8907

#### **Fredericton**

Tel: (506) 452-3124

## **Quebec**

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800, Place Victoria, Bureau 3800  
C.P. 247  
Montréal, Quebec  
H4Z 1E8  
Tel: (514) 283-8185

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#### **Drummondville**

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#### **Québec City**

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#### **Rimouski**

Tel: (418) 722-3282

#### **Sherbrooke**

Tel: (819) 565-4713

#### **Trois-Rivières**

Tel: (819) 374-5544

#### **Val-d'Or**

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P.O. Box 98  
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M5X 1B1  
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#### **Ottawa**

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#### **Sudbury**

Tel: (705) 675-0711

#### **Thunder Bay**

Tel: (807) 623-4436

## **Manitoba**

P.O. Box 981  
330 Portage Avenue, Room 608  
Winnipeg, Manitoba  
R3C 2V2  
Tel: (204) 949-6182

### *Local Office:*

#### **Thompson**

Tel: (204) 788-4486

## **Saskatchewan**

105-21st Street, 6th Floor  
Saskatoon, Saskatchewan  
S7K 0B3  
Tel: (306) 975-4400

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## **Alberta**

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10179-105th Street, Suite 505  
Edmonton, Alberta  
T5J 3S3  
Tel: (403) 420-2944

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Tel: (403) 292-4575

## **British Columbia**

P.O. Box 49178  
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Bentall Tower IV  
1101-1055 Dunsmuir Street  
Vancouver, British Columbia  
V7X 1K8  
Tel: (604) 666-0434

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#### **Prince George**

Tel: (604) 562-4451

## **Yukon**

Suite 301  
108 Lambert Street  
Whitehorse, Yukon  
Y1A 1Z2  
Tel: (403) 668-4655

## **Northwest Territories**

P.O. Bag 6100  
Precambrian Building  
Yellowknife, Northwest Territories  
X1A 1C0  
Tel: (403) 920-8571



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# INNOVATION

Supplement to Canada Commerce

Spring 1987





## Contents



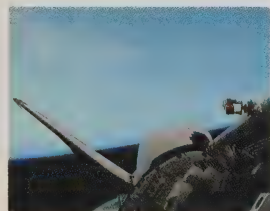
### 2 Satellites revolutionize surveying and navigation

University of New Brunswick scientists working to develop surveying and navigating uses for Global Positioning System (GPS) satellites.



### 5 Profile – Antenna Specialist Wins International Renown

Professor at the University of New Brunswick has become an internationally recognized expert in antenna testing.



### 6 Solving Canada's Materials Problems

The National Research Council's Structural and Materials Laboratory provides facilities to private industry for solving technical problems.

### 11 Lallemand Transforms Ancient Art

Through modern biotechnology, Lallemand has transformed the ancient art of yeast-making and captured world markets in the process.



### 13 From Happenstance to Science

Yeast and fermentation are processes long established in history but only recently understood.



### 14 TIEM—work to solve small business problems

TIEM Canada Inc. provides support to latent entrepreneurs in helping to solve some of Canada's economic and social problems.

### 16 Technology Transfers

### 19 Special Events

## Innovation Supplement

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

## Innovation

Technology Transfer Service (EOII)  
Office of Industrial Innovation  
Department of Regional Industrial Expansion, 235 Queen Street,  
Ottawa, Ontario K1A 0H5  
Tel: (613) 954-3474

## Photo credits

Masterfile

Daily Telegraph	p. 1
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(Également publié en français)

Hon. Michel Côté  
Minister of Regional Industrial Expansion

Hon. Bernard Valcourt  
Minister of State (Small Businesses and Tourism)





In spite of dire predictions that Canada is becoming a technological backwater, the fact remains that, as a nation, we support a wide range of world-class research facilities – at the National Research Council and the various provincial research councils, at our universities and in the private sector.

Canada's concern for adequate research support is shared by others. Every country in the world faces the same dilemma – how to allocate scarce funds among the hundreds of competing priorities?

And these priorities include not only the various fields of research, but the equally pressing business, social and infrastructure requirements for capital and operating funds.

Part of the answer lies in making more effective use of both personnel and finances. More and more, research organizations are reaching out to help the community at large, making available both their staff and facilities to solve technological problems. No longer can researchers look upon their labs, workshops and equipment as their own private fief, in particular if these facilities have been provided out of the public purse.

While the Structures and Materials Laboratory at the National Research Council, featured in this issue of *Innovation*, is primarily engaged in the

testing and development of new materials for the aeronautical industry, its staff and facilities are offered to a much wider clientele – firms that require sophisticated new materials like those developed for use in aircraft and space vehicles to remain at the leading edge of their own industries.

Centres such as the University of New Brunswick are also applying high tech developed for one segment of the economy to an entirely unrelated field of activity. Thus the military uses of the NAVSTAR Global Positioning System have been adapted to the fields of civilian surveying and navigation, as outlined in our coverage.

In the private sector, Lallemand has taken the world's oldest biotechnology product – yeast – and built a worldwide business supplying bakers, brewers and even France's most prestigious wineries with new and stable forms of this basic ingredient.

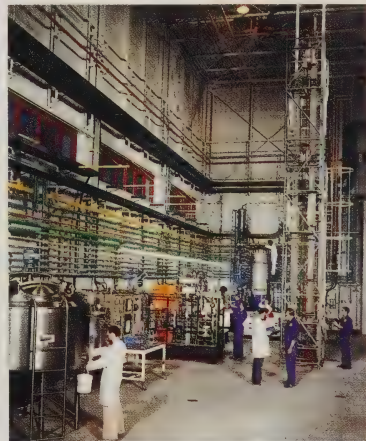
This issue of *Innovation* also takes a look at a new Canadian concept designed to develop entrepreneurs – TIEM. Backed by a large multinational company, one of Canada's largest investment dealers, and supported by the Canadian government, TIEM has developed a method of bringing the potential entrepreneur through six stages of development in an effort to reverse the current high failure rate experienced by new businesses.

Although in operation less than a year, Canada's largest provincially operated laboratory and research complex in Edmonton is proving to be a valuable asset for the Alberta Research Council.

The biotechnology pilot plant provides industry with research capabilities up to and including commercial application of biotechnological processes. It is a key element in Alberta's effort to diversify its economy by attracting new industries.

Other facilities include the Electronics Test Centre and Gasoline and Oil, Geological Survey, Soils, Industrial Services, Analytical Chemistry and Forest Products laboratories.

These resources augment the Research Council facilities in Calgary, Devon, Nisku, Red Deer and Lethbridge.



The Alberta Research Council's biotechnology pilot plant.

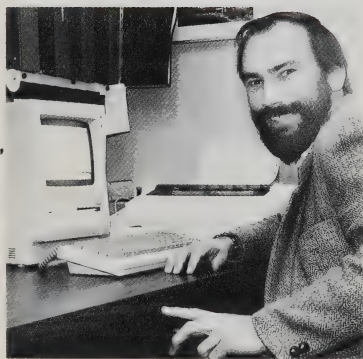
By JEANNE INCH

University of New Brunswick

## Satellites revolutionize surveying and navigation

**S**ATELLITES are to the 1980s what railroads were to the mid-1800s. They are roads to a new frontier – to new ways of working, of collecting and disseminating information, of navigating and of manufacturing. Already communication and weather satellites are taken for granted. And all across Canada, there are Canadians hard at work developing satellite technology.

At the University of New Brunswick (UNB), engineers and scientists have been working on a variety of space-related research projects for several years. This story takes a look at the contributions surveying and electrical engineers are making in developing the uses of the Global Positioning System (GPS) for surveying and navigating.



Richard Langley, UNB surveying engineer.

In the 1600s, when navigators were steering their course to the New World by the stars and crude instruments, no one imagined that the generations of the late 20th century would wear wrist watches measuring time down to the millisecond.

In 1987, no one can predict how future generations will be affected by current space exploration and satellite development.

That's how Richard Langley, a geodesist in surveying engineering, views space-related research – an open door to endless possibilities.

For several years, he and his University of New Brunswick colleagues in engineering have been working with data from a particular group of satellites, those of the NAVSTAR Global Positioning System (GPS). When these seven satellites were designed in the early 1970s by the United States Department of Defense, few people foresaw their usefulness to civilians.

These satellites, which orbit the earth every 12 hours at a height of 20 000 km, are now being used by non-military personnel for surveying and navigating.

Geophysicists and engineers use them to monitor such phenomena as movements of the earth's crust associated with earthquake activity, volcanic action and continental drift.

The receivers, which pick up signals broadcast by the GPS satellites, have become commercially available. But the price tag of \$100 000 to \$200 000 for a receiver prohibits wide-scale purchase.

Dr. Langley predicts the price will drop and the size of these bulky receivers will shrink, possibly to wrist-watch dimensions.

That's far in the future. Not so far removed is the installation of GPS receivers as the ultimate navigational device in the automobile. Even now, Japanese and American car manufacturers are considering GPS receivers as top-of-the-line options for the cars of the 1990s at a cost of \$1000, not out of line with the high-quality tape deck of today.

The GPS system in space will be complete when 18 satellites are in orbit and three spares have been launched. That date has been postponed to the early 1990s because of the U.S. space shuttle disaster, Dr. Langley explains.

"When the system is fully operational, and the prices are down, surveying engineers will be able to move right in and start using it in a big way."

The UNB surveying engineering team, with the help of graduate students and research assistants, has been preparing for that time for several years. It has developed computer programs for planning surveys using the GPS system and for



processing data collected by GPS receivers. It has been working on programs for navigating – on land and sea and in the air – via GPS satellites. And it has examined potential uses of this new technology and shared those ideas with colleagues in Canada and beyond.

Most of the team's work has been done at computer terminals using data collected by others.

But this summer, the team moved out of the lab and into the field to conduct a survey of southern New Brunswick. With financial assistance from the Natural Sciences and Engineering Research Council (NSERC) and the Canadian International Development Agency (CIDA), the team rented four GPS receivers from an Edmonton company, Canadian Engineering Surveys.

And with the aid of the Land Registration and Information Service (LRIS) (a joint service of the Maritime provinces) and a team of students, the researchers completed their survey in two short weeks. Using traditional methods of surveying, the job would have taken months, including time to cut down trees or build towers to ensure clear lines of sight for the measuring instruments.

### Surveying via Satellite

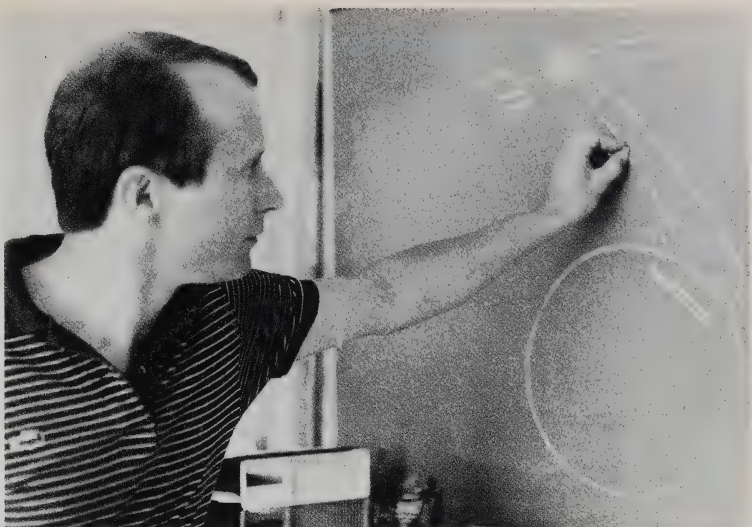
"The one big advantage of GPS is that it is an all-weather system which operates day and night," says Dr. Langley, who helped organize the survey. "GPS doesn't have to be able to 'see' another point in order to measure it. The receivers only have to sense the satellite electronically."

The survey via satellite worked this way: one receiver was stationed on the roof of Head Hall on the UNB campus; the other three were rotated among 11 observation stations in an area bounded by Saint John, Nackawic, Windsor, Chipman and Moncton.

The seven GPS satellites in orbit continuously broadcast coded signals of their positions to the ground receivers. By measuring the difference between the time these coded signals were sent and the time they were received, the relative positions of the receivers were calculated within an accuracy of a few centimetres.

The data were recorded on computer tape and are now being processed using software developed at UNB. The completed survey, in cassette form, will be passed on to LRIS for use as a control network for mapping purposes.

A measure of the success these survey scientists and engineers are having in the high-tech world of space research is their work on a computer program for planning surveys like the one carried out in New Brunswick last summer. David Wells, who has been working on navigation applications with Alfred Kleusberg, NSREC research fellow in surveying engineering at UNB, spent a year in West Germany working on the geometry required for positioning using GPS. Edmonton's Canadian Engineering Surveys picked up these ideas and developed a unique software package for practical survey design.



Another UNB success is a differential positioning program (DIPOP) for processing GPS observations. This program has been distributed in Canada and overseas and is used by organizations such as the Defense Mapping Agency in the United States.

And there is MacSat, a Macintosh computer program for tracking satellites, in real time or simulation. "Initially, we developed MacSat as a teaching tool for our students. But it is a general purpose program which any interested amateur or professional can use," Dr. Langley says.

### International Co-operation

Adam Chrzanowski, a professor of surveying engineering at UNB, also made use of the rented receivers. For several years he has been surveying the Mactaquac Dam in an attempt to determine if changes in the dam's superstructure were caused by shifts in the dam itself or in the area surrounding it. Because the traditional tools of surveying must be in full view of each other, the surveyed area until now has been restricted to a 2.5-km radius.

To get a complete picture of activity in the area, a diameter of 50 km must be surveyed, Dr. Chrzanowski points out. Satellite technology makes this possible.

"After repeating the survey in the next year or two and comparing the results, we shall be able to detect what types of movements are taking place in the whole area. We will be able to distinguish between separate local movements of the dam itself and possible geological movements in the region."

Dr. Chrzanowski had another reason for surveying the Mactaquac Dam. Together with Dr. Langley, he is testing a number of different

Alfred Kleusberg, Natural Sciences and Engineering Research Council research fellow in surveying engineering, is working on navigating via satellite.



**The second Global Positioning Satellite (GPS) survey of the Mactaquac Dam on the Saint John River.**

GPS receivers for use in a much bigger project in Venezuela — the monitoring of ground settling in oil fields and its effect on a 40-km dyke that protects people living below the water level of a large lake. They must choose the most accurate and most economical receiver to be integrated into a local monitoring system next year.

**Mapping the Oceans**

Satellite technology promises great things for surveying and monitoring the movement of land masses. But its applications on the seas may be even more beneficial. Mapping the oceans is extremely difficult for a very obvious reason — there are no landmarks to indicate, for example, international boundaries or the location of mineral deposits on the ocean floor.

GPS technology has joined two fields that once were quite separate: surveying and navigation.

"You are surveying with GPS unless you need to know where you are and where you are going in real time. Then you are navigating," explained Dr. Kleusberg.

"In navigating there is no extended period of time to collect the information because the vehicle (with the receiver on board) is moving from second to second."

Dr. Kleusberg is designing a computer program which will eliminate errors in data obtained from satellites for navigational purposes.

The "fun" part of his research is determining how the movement of the vehicle affects the data collected by the receiver: an airplane is faster than a car, a ship pitches and rolls. This difference in movement affects the way the data are processed.

Dr. Kleusberg has been working with land data collected in tests using a truck on a pre-

surveyed highway in Alberta. "The advantage of this test is the presence of an external control which is necessary in order to test our technique and our methods of computing."

In November, Dr. Kleusberg tested his technique on board a ship in sea trials sponsored by the Canadian Hydrographic Service.

**Sharing the Results**

These satellite surveyors do not keep all this knowledge to themselves. In 1985, Dr. Langley, Dr. Wells and Dr. Kleusberg formed Canadian GPS Associates with their colleagues, Petr Vanicek (who calls himself the dreamer of the group) and James Tranquilla, of UNB's electrical engineering department, plus six other scientists and engineers.

Since then, this group has been travelling the country explaining GPS technology and its applications to engineers and other potential users. With Dr. Wells as editor, they are now putting together a 500-page manual on GPS positioning.

The wide appeal of GPS technology is illustrated by the variety of professionals to whom this guide is directed: hydrographers, geophysicists, geologists, geographers, oceanographers, space scientists, and professionals in management, transportation, forestry and agriculture.

As manufacturers are working on a hand-held GPS receiver with a pop-up antenna and miniature computer screen, these scientists and engineers are developing practical uses of this exciting new technology.



# Antenna Specialist Wins International Renown

**J**AMES TRANQUILLA, Electrical Engineering professor at the University of New Brunswick, is one of the few people in the world who understands how antennae on satellite receivers really work.

The fact is that antenna manufacturers from as far away as California are asking Dr. Tranquilla to test the accuracy of their antennae. In some cases, Dr. Tranquilla gets first crack at testing a prototype antenna.

Dr. Tranquilla's expertise in satellite receiver antennae has been acquired over the past six years. Until recently, he has concentrated on analysing antennae on communication and weather satellite receivers.

But when surveyors began to use the satellites in the NAVSTAR Global Positioning System (GPS), his focus changed.

It became obvious to antenna manufacturers and users that the GPS antennae were not accurate enough for some surveying and navigation applications.

"Surveyors need to know exactly where they are within a few centimetres," Dr. Tranquilla says. The antennae which work just fine for weather satellites cause errors in data collected from GPS satellites.

"These antennae alter the phase – the property of the electromagnetic wave that's related to how far it has travelled from the satellite to the receiver. The farther the wave travels, the larger the phase number," Dr. Tranquilla explains.

"The antenna adds to the phase, not a lot, but enough to be significant when an accuracy of a few centimetres is required. We have to know how many centimetres or millimetres to subtract in order to know the true phase."

The manufacturers are now aware of this problem, but lack the expertise to do anything about it. As an individual researcher and as a consultant with Canadian GPS Associates, he is sharing his particular expertise not only with manufacturers, but also with government agencies in Canada and the United States and with potential users of GPS satellites, through testing and development stages.

Dr. Tranquilla is working on a design of an antenna, one that will meet that first vital requirement for accuracy. Once he builds a prototype, it will be up to an interested manufacturer to take it further.

Until this past summer, Dr. Tranquilla did all of his tests in the anechoic chamber in UNB's Electrical Engineering Department. This chamber, like a television studio, is a quiet room where no reflections or interference can affect the performance of the antennae.

The obvious next step was to test the same antennae in the real world, surrounded by trees, on top of buildings, near railway tracks and under power lines.

So, he tested the antennae used by the surveying engineers in their survey via satellite to compare the results obtained in the field with those in the ideal world of the anechoic chamber.

Last fall, he joined the surveying engineers again in sea trials of different GPS satellite receivers. While Alfred Kleusberg was testing his computer program for navigating by GPS satellite, Dr. Tranquilla was observing how the antenna is affected when it is on the mast of a ship, surrounded by cables and wires.

Dr. Tranquilla expects the new generation of antennae to be available for testing in the next few months. Chances are he will get first chance at determining whether or not many of them make the grade.



James Tranquilla has become an expert in how antennas on satellite receivers work.

# NRC's Structures and Materials Laboratory

# Solving Canada's Materials Problems

**W**ITHOUT a doubt, the aeronautic and space industries are at the leading edge of materials development. It is only natural, therefore, that the Structures and Materials Laboratory be part of the National Research Council's (NRC) National Aeronautical Establishment (NAE).

According to Dr. W. Wallace, head of the Structures and Materials Laboratory, an increasing number of other industries are making use of these facilities to answer technical problems. In particular, research activities centre on the design, strength and structural integrity of aerospace structures and, therefore, the properties of structural materials are of prime importance.

Although much of the work is done in collaboration with other research institutes, universities, large industries and government agencies, Dr. Wallace and his staff also respond to technical enquiries from small companies and the general public. The staff consists of about 50 employees and a number of students and guests work along side them, making use of the lab's unique equipment.

Inviting guest researchers is an activity that Dr. Wallace encourages, since it makes more efficient use of millions of dollars worth of advanced test analytical and process equipment, much of it unique in Canada and possibly the world. As an example of this, Dr. Wallace has personally supervised more than a dozen student projects, many at the graduate level.

Research activities are divided into several areas: Metallic Materials, Composite Materials and Structures, Non-destructive Evaluation, Fatigue and Damage Tolerance of Structures, Aeroacoustics and Engineering Physics.

## **Metallic Materials**

Many of the alloys used in the aerospace industry and, to a growing degree, in other sectors have several alloying ingredients which contribute to strength, workability, corrosion resistance and a host of other attributes. Their microstructures

are complex due to the large number of phases and precipitates which can form under various conditions of heat treatment or thermomechanical processing.

Typically, in the lab, researchers can determine changes in grain size and shape, grain boundary structure and precipitate distribution as a function of temperature, time and cooling rate during heat treatment or thermomechanical working or welding. Researchers also study the fracture surfaces of failed components to determine the crack initiation sites and the mechanisms of crack propagation. By correlating this information with such other factors as fabrication history or conditions of service, it is often possible to establish the exact cause of the failure.

Since each component of an aircraft must meet stringent design specifications for the expected service conditions, the choice of material will be based on appropriate tests to determine such properties as strength, ductility, creep and fatigue resistance, fracture toughness, corrosion resistance, density and stiffness. Cost is also a factor in the final selection of materials. The lab contains equipment to perform the sophisticated mechanical tests which are becoming increasingly important due to tougher performance requirements.

Several universal testing systems can be computer controlled to perform tests under a variety of loading and environmental conditions. For example, one of the lab's machines has been set up to measure the effect of combined creep and fatigue loading in corrosive environments and at temperatures up to 800°C. These tests, designed to investigate the growth of cracks in turbine engines under simulated service conditions, allow turbine engine users to determine the life span of components and engine overhaul inspection intervals.

**"In particular, research activities centre on the design, strength and structural integrity of aerospace structures..."**





### Powder Metallurgy Processing

Since powder metallurgy offers several advantages over the conventional processing of ingot materials, the laboratory has been investigating this area for several years. Among the advantages of these materials are:

- Powders tend to be of uniform composition and, after consolidation, produce a non-segregated structure.
- Grain sizes are small which improves strength at ambient temperature and formability at high temperature.
- Powders can be compacted to a near-net shape, thereby lowering machining costs.

As a result of these investigations, staff members are experienced in handling and encapsulating nickel-base superalloy powders to avoid contamination, in consolidating powders by hot isostatic pressing or extrusion, and in further processing the consolidated material by forging and heat treatment. Recently, this work has been expanded to include powder processing of aluminum and titanium alloys.

To aid in this work, the laboratory has a hot isostatic press (HIP) capable of applying high pressure and temperature simultaneously. This pilot-plant scale HIP system is the only facility in

Canada capable of applying pressures up to 210 MPa and temperatures up to 2000°C. In addition, the system can be programmed to impose specific heating and cooling rates during processing.

The three main areas of application of HIP are:

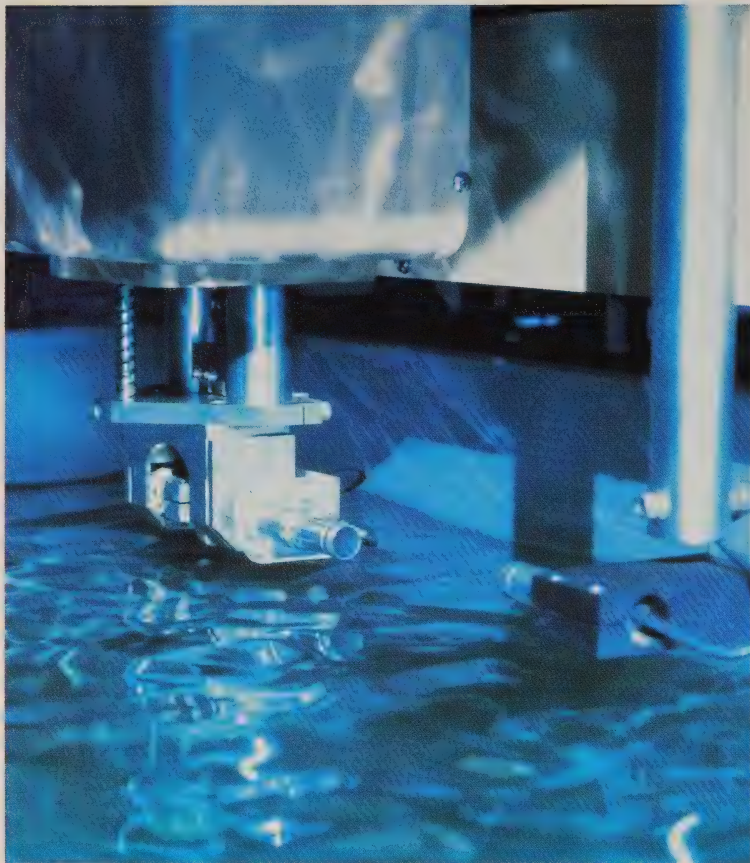
- consolidating metallic or ceramic powders or metal-matrix composites to 100 percent theoretical density;
- closing subsurface cavities, microporosity or other defects in castings or service exposed turbine components; and
- joining metals by pressure diffusion bonding.

### Isothermal Forging

The laboratory has modified a 450-tonne hydraulic press for use as an isothermal forging press. Isothermal forging is a process which allows high performance metallic materials to be deformed under closely controlled temperatures and strain rates.

Metallic pancakes up to 85 mm in diameter can be forged at temperatures up to 1100°C. These are large enough to be heat treated and cut for mechanical testing.

A thermal vacuum testing facility was developed to test the joint brakes on the Canadarm, shown here in action on NASA's space shuttle.



Ultrasonic C-scan facility.

### Composite Materials

Since the 1950s, aircraft manufacturers have been using composites in non-critical aircraft components. Recently, however, they have started to use stronger composites such as plastics reinforced with high-strength fibres, for example, graphite, kevlar or glass, for primary flight-critical components.

These composites, because they are very strong, stiff and light, enable structures to be built with considerable savings in weight. The composite section of the laboratory works on the development, evaluation and application of composite materials, especially fibre-reinforced polymers, and has made several important contributions in the field of epoxy matrices.

The composites facility consists of a chemical lab, a lay-up shop and equipment required for the preparation, curing and testing of composites. The equipment includes conditioning cabinets, a hot press, various ovens, an Instron, pendulum impact and constant amplitude fatigue testing machines, and an autoclave jointly operated with NRC's Division of Mechanical Engineering.

The autoclave is a cylindrical chamber (12 m in diameter and 1.8 m long) which can be pressurized up to 1.4 MPa (200 psi) and is used for curing composites. The gas medium can be electrically heated up to 370°C and the entire system is computer controlled.

The laboratory conducts numerous mechanical tests according to such standards as those defined by the ASTM and NASA, to characterize the material and evaluate its performance. The data obtained can be used in the design, analysis, manufacture and testing of structural components made of these materials.

### Non-destructive Evaluation

The demand for higher levels of reliability in manufactured products has increased to the extent that quality assurance is now an important part of the manufacturing process.

This is especially relevant in the aircraft industry where aspects of safety are so critical. Therefore, great efforts have been devoted to the development of methods for assessing initial quality and monitoring deterioration that may occur in service.

In addition to standard chemical and physical tests, non-destructive evaluation (NDE) techniques have proved useful in detecting such flaws as cracks, voids and inclusions in metallic materials. Over the years, the Structures and Materials Laboratory has developed expertise in the application of NDE techniques to conventional aircraft materials. The inventory of equipment includes dye penetrant and magnetic particle kits as well as portable ultrasonic, X-ray and impedance instruments.

With the increased use of fibre-reinforced composite materials, it has been necessary for the laboratory to acquire and develop instrumentation capable of detecting flaws such as delaminations and porosity which can affect the structural performance of these materials. Ultrasonic techniques are sensitive to transverse delamination and, using scanning techniques, they can provide a means of examining large panels. The lab's ultrasonic C-scan machine combines an ultrasonic unit with a computer-controlled scanning system. The output is an image of internal defects displayed in a line-scan format similar to that used in a television receiver.

The scanner is based on an immersion tank 183 cm long, 122 cm wide and 122 cm deep which can be partially drained to permit through-transmission testing with water jets mounted on a manipulator yoke. The system is capable of scanning at rates of up to 15.2 cm/sec. on any of the three linear axes and any combination of scan and index axes is allowed. To facilitate inspection of parts with cylindrical symmetry, the system is equipped with a digital turntable. Proposed enhancements to the system include a computer control system interfaced to an existing 32-bit minicomputer so that image enhancement techniques can be used to improve the probability of flaw detection in C-scan imagery.



Plans are now in progress to investigate other NDE techniques which may be applicable to composite materials, in particular those used in aerospace applications. These techniques include:

- acoustic emission testing where stress waves are produced by local damage growth caused by the application of load to the part; and
- acousto-ultrasonic testing where stress waves are induced by the injection of ultrasonic waves and detected by means of emission sensors.

#### **Fatigue and Damage Tolerance**

While fatigue, in the traditional sense of load cycles to failure, is still an important design criterion, current emphasis is placed on improving the ability of a structure to tolerate flaws that may have been induced during manufacture or appear during service.

A new emphasis is now placed on the length of time that a flawed component can be used safely. The combination of residual static strength, crack initiation and crack growth studies known as damage tolerance assessment can provide insight on the question.

While these studies have been part of the testing for most modern materials and results are known, data are seldom available for older materials and forgings. The laboratory, therefore, maintains computer-controlled servo-hydraulic test machines ranging in size from 20 to 200 kN that are used extensively to determine crack growth characteristics. The machines can provide crack growth data under specific geometrical conditions where there are reservations concerning the applicability of linear elastic fracture mechanics (e.g., for very short cracks) and for determining crack growth under spectrum loading.

The group involved in this activity has dealt with a broad range of components over the years, and has considerable expertise in fixturing as well as extensive knowledge of non-destructive evaluation (NDE) techniques.

Before assessing the fatigue life or damage tolerance of a structure, it is necessary to determine the loading that the structure experiences in service. So the laboratory has developed an extensive loads data acquisition and analysis facility using transducers to measure and record stresses. By using such analyses, fleet managers can assess the impact of the aircraft's operational role.

#### **Full-scale Tests**

The ultimate validation of fatigue and damage tolerance analysis is the full-scale fatigue test. This brings together the expertise of the various groups. While not in continuous use because of the large investment in time and money required, the necessary equipment is maintained by the lab since such tests serve as a focus for much of the work that is done. They also help to ensure that the test work is of a practical and useful nature.

#### **Flight Impact**

Since 1969, the laboratory has maintained and operated facilities for the study of bird impacts under laboratory conditions. The threat of serious damage to aircraft during take-off and landing has multiplied as aircraft speeds have increased and therefore design of windshields and other vulnerable parts must take this into consideration.

Facilities at the lab include two pneumatic cannons which can accurately propel bird carcasses against stationary targets at speeds up to 427 m/s (955 mph). These "bird guns" are located at NRC's Uplands, Ottawa, site and are supported by instrumentation which includes several high-speed cameras capable of recording impact speeds



Aircraft windshield damaged  
by a bird impact.

up to 9000 frames per second. Heaters and liquid nitrogen-based cooling systems are available for conditioning test articles to high and low temperatures in the range of  $-40^{\circ}\text{C}$  to  $54^{\circ}\text{C}$ .

#### **Aeroacoustics**

The Aeroacoustics Group performs research on the mechanisms, the effects and the processing of acoustic noise and signals involved in the operation of aerospace vehicles and other high-level noise sources. These areas include:

- studies on the generation of high-intensity noise by aerodynamic flows;
- the excitation and fatigue of structures due to noise;
- the advanced processing of speech signals for machine interaction.

Typical examples of high-level aeroacoustic noise sources include high-speed jets, rocket exhausts, high-speed fans and propellers, turbulent and unsteady airflows and shock waves.

These high-level noise sources can produce adverse effects such as vibration and fatigue on aircraft and space vehicles as well as on people and buildings in the vicinity. The research and development required to solve aeroacoustic problems involves the complementary disciplines of structures aerodynamics, flight testing and digital signal processing.

A major effort of some of the Aeroacoustics Group over the past few years has been research into future speech technology applications in cockpit automation.

#### **Engineering Physics**

Machine vision research at the laboratory has focused on the application of photogrammetry to

real-time position sensing and guidance control. Photogrammetric techniques enable an operator to derive the position and orientation of an object from a two-dimensional camera image of it.

Technology developed since the early 1970s has advanced to the use of closed-circuit television cameras, patented image-processing hardware and proprietary photogrammetry algorithms which provide on-line, real-time operation. Packaged together, this technology is referred to as a Real-time Photogrammetry System (RPS).

The RPS is being further developed as the heart of a Space Vision System (SVS) experiment which is part of NRC's Canadian Astronaut Program. The object of SVS is to assist astronauts in tasks such as the grappling and docking of space payloads and satellites, or even the assembly of the space stations. The system was slated to be in use last year but was postponed until the rescheduling of the space shuttles.

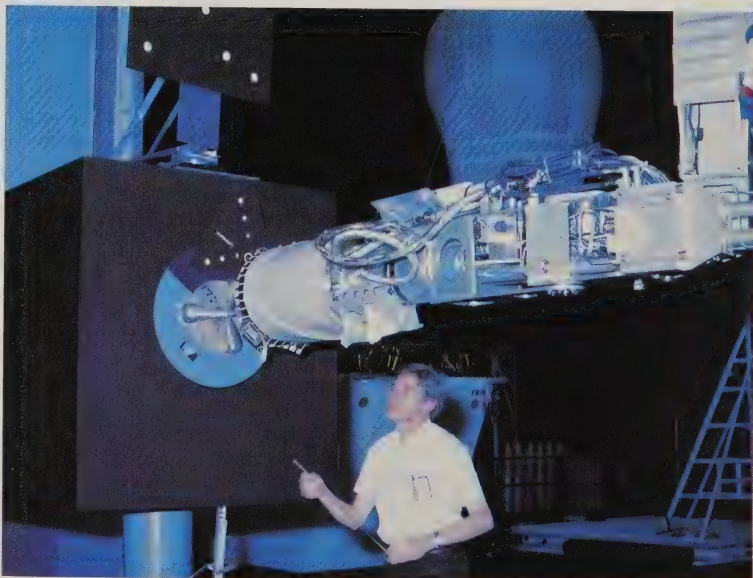
On a more mundane level, RPS technology has been transferred to the private sector for the development of industrial robots for welding and for unloading conveyors. Research into improved systems for both space and industry is continuing.

For the small and medium-sized business with structural materials problems, the NRC facilities and expertise are available within the constraints of time and staff.

In the words of Dr. Wallace: "Our labs are not for the privileged use of our few NRC employees, but rather they are a national resource that must be made available to as many users as possible from industry, universities and government."

Further information regarding the use of these facilities or the initiation of co-operative research studies can be obtained by writing to: Dr. W. Wallace, Head, Structures and Materials Laboratory, National Aeronautical Establishment, National Research Council Canada, Ottawa, Ontario K1A 0R6.

A space vision system, developed by the NRC Space Technology Program, assists a Canadarm simulator in a grappling task during a demonstration at the Johnson Space Center, Houston, Texas.





## Through Modern Biotechnology

# Lallemand Transforms Ancient Art

**Lallemand's 150 000 litre commercial fermentator.**



**O**VER the past seven years the Montréal firm of Lallemand Inc. has spent over \$10 million modernizing its equipment for the production of the world's oldest biotechnology product – yeast.

In its latest expansion, completed in mid-1986, Lallemand opened new pilot plant facilities which allow it to marry existing fermentation expertise with computerized control – a process which will allow Lallemand to increase its share of world yeast markets.

The completion of the pilot plant facilities enables Lallemand to research and develop improved fermentation techniques and to evaluate new yeast strains in commercial applications.

Since it started production in 1923, Lallemand has always made improvement in strain selection and process control a priority. And for the past 15 years, the emphasis has been on more active strains with improved storage stability. Other innovations have been aimed at better packaging – granular yeast in bags, compressed block yeast in plastic film and, most recently, bulk liquid yeast.

During the past three years, Lallemand has developed a bulk handling system to deliver liquid yeast to commercial bakeries. Two large bakeries in Montréal now receive and use liquid yeast for all of their production – the first in North America to use this system.

The concentrated yeast liquid is shipped to the bakery in tanker trucks like those used to transport milk. At the bakery, it is stored in refrigerated tanks. From here the yeast liquid is fed to the bakery's mixers through a magnetic flow meter controlled by a microprocessor batching system. This computerized control reduces product handling and improves scaling precision to the mixers. Yeast performance and stability are also improved and the system brings the bakery one step closer to full automation.

With the baking industry in a static situation during the early 1970s, Lallemand started to explore new markets for commercial yeast. The two areas showing the most promise were distilling and commercial wine production. The company successfully introduced specialized strains to both of these markets.



**A packaging machine for fresh block yeast and a fully automatic pilot (research) fermentator.**



By 1978, sales of two wine yeast strains, primarily in California, proved that wine yeast had a developing market. Sensing that Europe would provide the largest demand, Lallemand undertook market research and development in the major European wine regions and was rewarded with increased sales. It also uncovered an interest in new wine yeast strains. With a commitment to these new developments, the company initiated contacts with wine institutes and as a result increased the number of yeast strains offered.

With the development and commercialization of specialized yeast strains, export sales to Europe grew rapidly. This past year, Lallemand produced and exported some 15 strains of wine yeast to European wine regions, becoming one of the largest and fastest growing wine yeast producers in the world. Lallemand now holds a major share of the market, improving its position by responding to industry needs.

Apart from the dried wine yeast, Lallemand also markets malo-lactic bacteria, used for the de-acidification of wine. More recently, the firm has become partners with a major supplier in Champagne to produce and market immobilized yeast cells for the region's famous products. In addition to Europe, markets in New Zealand,

Australia and South America are supplied by Lallemand. Last year's production consisted of enough wine yeast to produce a billion and a half bottles of wine.

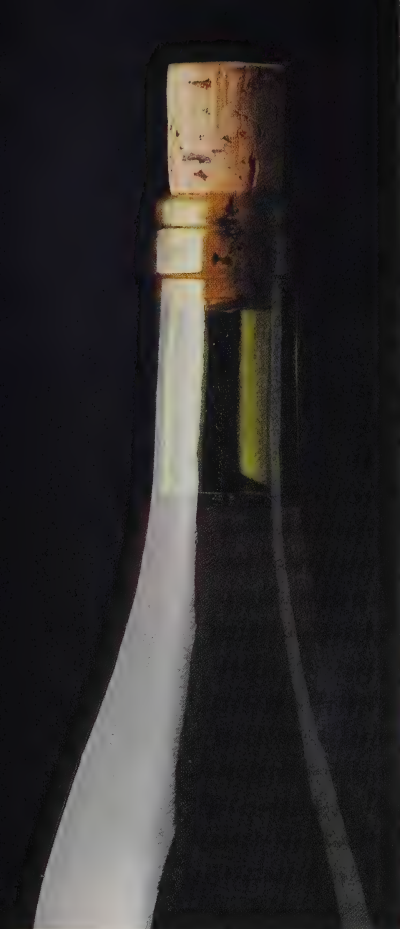
This latest expansion includes two new pilot fermentators as well as a commercial one. All three fermentators are totally automated and allow fermentation research in the pilots to be scaled up to commercial size.

The pilot fermentators both have a capacity of 2000 L and are equipped with a variety of sensors and controls to measure pH, dissolved oxygen, NADH and alcohol. The analysis of exhaust gas is also possible. To permit complete plant development of new strains, downstream harvesting equipment allows separation, dewatering and drying of the test yeast strains.

In the meantime, the new commercial fermentator has a capacity of 150 000 L and is connected to the same control system as the two pilot fermentators. This allows scale-up trials to be conducted, using the same fermentation parameters with the same on-line software. The ultimate goal is complete automation of the fermentation process with feedback control.

One of the goals in developing this new project was to enable the system and equipment to work with biotechnology products other than yeast.





**"...it was mostly by chance that bakers and brewers developed their products."**

Existing fermentation technology is being used to develop applications for new micro-organisms and to evaluate their use in commercial fermentation processes. Another future area of research is the evaluation of all available substrates and their potential for yeast production with improved yields and reduced production costs.

In a joint venture with Laval University, research is being aimed at developing a yeast strain with greater resistance to freezing and to higher alcohol levels. The use of modified wheat as a supplement to molasses in the commercial production of yeast is also being evaluated.

Lallemand's commitment, both technologically and financially, is to improve existing yeast technology and to enlarge the range of micro-organisms and potential products required to remain competitive in the 21st century.

## From Happenstance to Science

**Y**EAST and fermentation have been part of daily life since at least 4000 B.C. when Egyptians enjoyed leavened bread washed down with beer and wine. And the Romans spread these customs throughout the then-known world. To assure an adequate supply of wine, the Romans even planted grape vines wherever they went.

But yeast fermentations were not understood and it was mostly by chance that bakers and brewers developed their products. To assure some consistency, until quite recently bread was made from "sourdough", a method whereby the baker would keep a small amount of the yeast-infected dough to inoculate the next day's production. And alcoholic fermentations continued to be left to chance and spontaneous development.

During the early 19th century, by-products of the distilleries and bakeries were used to ferment bread dough. As the bakeries became larger, the distilleries found an increased market for their residues. And, towards the end of the century, it was the researchers, Pasteur and Hansen, who discovered the role of yeast in fermentation and the importance of pure culture formations. This, in turn, led to the establishment of several firms, each of which produced modest amounts of yeast from aerated grain mashes.

As the availability and cost of grain in Europe became a deterrent factor, researchers in Berlin developed a method for producing yeast from molasses fortified with ammonium salts. Subsequent research improved the yeast yield without alcohol production. Today the industry still employs this modified Deloffre process, tailored to exploit the new strains being used. Research over the last 30 years has centered on yeast strain improvement and automation of the fermentation process.

# TIEM—work to solve small business problems

**"The substantial support for TIEM among government, business leaders and local communities reflects the recognition of small business as a major force in the Canadian economy."**



Like, as some futurists think, big businesses in Canada and other industrialized nations are dying or already as dead as dinosaurs, then TIEM Canada Inc. of Mississauga may well have solutions for some of Canada's emerging economic and social problems.

And those solutions are based on providing support to latent entrepreneurs – the backbone of small businesses. It is a program that is receiving federal government backing and financial support on a results-oriented basis.

TIEM is a Canadian company that has, under licence from Control Data Canada (CDC), adapted CDC's Small Business and Job Creation Network Technology to Canadian conditions by adding a pre-incubator stage to the formula. Since first being applied in the U.S. and Europe in 1979, this Control Data technique has led to the establishment of some 200 new businesses a year of which close to 90 percent are still in business five years later. This compares with the generally accepted failure rate for new small businesses of some 80 percent – in other words, a complete reversal of results.

The TIEM concept incorporates six key elements:

- **Business Opportunity Program**

Involves conducting a detailed analysis of the targeted community to identify viable business opportunities for local entrepreneurs.

- **TIEM Centres**

Provide each approved entrepreneur with targeted training and on-site guidance, prior to starting operations. Over 90 percent of business failures are attributed to poor management practices.

- **Business Technology Centres**

Provide start-up enterprises with affordable office space and shared office services.

- **Seed Capital Funds**

Address the problem of start-up capital for small businesses by establishing a community-funded and -managed seed capital fund in each targeted centre.

- **Employee Training**

Provides for the timely training of skilled employees to meet current and projected labour requirements.

- **Community Co-operation Boards**

Composed of locally based business, financial and public sector representatives, the boards co-ordinate community resources and assume responsibility for the establishment and administration of the seed capital funds and the Business Technology Centres.



The project was begun early in 1986 in five designated cities – St. John's, Newfoundland; Sydney, Nova Scotia; Québec, Québec; Winnipeg, Manitoba; and Vancouver, British Columbia. To get it under way, particularly the Business Opportunity Program, the TIEM Centres and the Employee Training sectors, the federal government agreed to provide some \$40 million in repayable loans and results-oriented training allowances.

Under the federal funding scheme the Department of Regional Industrial Expansion is providing a repayable contribution of \$11.8 million for TIEM's start-up and operating expenses during the first three years of operation. TIEM will repay the amount in years four and five.

Federally funded studies and analyses have been completed and TIEM Centres established in the five designated cities.

In parallel funding, the Canadian Employment and Immigration Commission (CEIC) may contribute as much as \$28.2 million under the Canadian Jobs Strategy Innovations program, designed to provide financial assistance for pilot and demonstration projects that test new solutions to labour market problems.

The agreement between CEIC and TIEM provides for the payment of \$14 000 or more for each permanent job which lasts for two years. Half of the amount is payable when the job is created, with the balance payable in two equal installments at the end of the first and second years. Any jobs which do not last the two years are subject to a repayment clause. Approximately 3300 new permanent jobs are expected to be created over the five years of the agreement.

In addition to the CEIC grants, TIEM will receive a small royalty on sales made by the firms established under the program. In return, the firms will be provided with ongoing advice and assistance.

As a private enterprise, TIEM has brought together a team of experienced private sector business developers, and two of Canada's most experienced firms in entrepreneurship – Control Data Canada and McLeod Young Weir – who, along with the Federal Business Development Bank, are shareholders in TIEM.

Although TIEM has been in operation for less than a year, it reached most first-year goals in its first six months.

The five targeted TIEM Centres were established, managers selected, some 560 of the 1950 entrepreneurs who applied were interviewed and, of the 150 who qualified, 60 were enrolled at the centres and six were setting up business. By the end of November 1986, the five Community Co-operation Boards and local seed capital funds had been established.

At the same time, TIEM management had convinced large financial groups, such as insurance companies and pension funds, to invest in local seed capital funds under the federal government's provisions for such funds as outlined in its last budget. Under these provisions, such institutions would be able to match every locally

raised dollar with three. The management also reached tentative agreement with most provincial governments to provide a further four dollars to match the one dollar funded locally.

Thus, for every million dollars raised locally for the seed capital fund, the financial institutions may invest \$3 million, which, if matched by the province, provides \$8 million dollars for investment in the locality's new businesses.

Another accomplishment has been the sign-up of local accounting and law firms willing to provide accounting and legal advice to new businesses at no or low cost to the client.

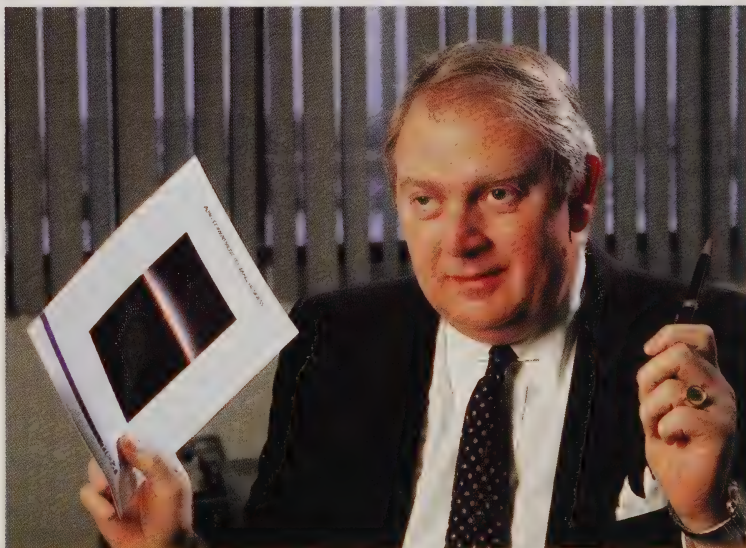
While it is too early to assess the success of this experiment in entrepreneurship, it is an interesting development that follows recent government initiatives to work with the private sector in all facets of the economy.

Although most of the concepts and ideas put forward by TIEM's business program have been tested and tried under a variety of conditions, it is thought to be the first time that all the ingredients have been brought together in a comprehensive package, particularly one of this size and scope.

Chris Scott, chairman of the board of TIEM, is confident. "The TIEM concept is not only a formula for entrepreneurial success," he says. "It's also a framework for community-based economic renewal.

"The substantial support for TIEM among government, business leaders and local communities," Scott adds, "reflects the recognition of small business as a major force in the Canadian economy."

**Chris Scott, TIEM Chairman**



# Technology Transfers

## Offered

### Canada

- High-resolution Quadrupole Mass Spectrometer
- Large-diameter Instrumented Sheave Block
- Variable Volume Sampler for Aerosols and Gases
- Forced-draft Fire Drainage System
- Camera Lens Masks to Determine Co-ordinates
- Frequency Offset Diversity Receiver System
- Particle Injection Device for Thermal Spraying
- Safety Helmet
- Wood Furnace

### Federal Republic of Germany

- Waste Conversion Device
- Insulation Material
- Lead Recycling Process
- Granulation Technology
- Long-life Engine

### France

- Micrography
- Abattoir Waste Converter
- Bandage Cutting Devices
- Pipe Supports
- Robot Cleaner
- Filtration Systems
- Optical Lamp
- Mini Drink Dispenser

### German Democratic Republic

- Buffing Process
- Electrocardiograph

### Japan

- Ceramic Tiles

### Switzerland

- Self-service Car Wash

## Requested

### Britain

- Health Care Products and Services

# Offered

## Canada

### High-resolution Quadrupole Mass Spectrometer 8228

By applying a very small DC voltage, modulated at a few hundred hertz, to the quadrupole rods of an RF quadrupole mass spectrometer, it is possible to obtain a much improved signal-to-noise ratio and significantly higher resolution.

### Large-diameter Instrumented Sheave Block 8270

This large sheave block was designed to handle the electromechanical cable attached to underwater towed vehicles where bending radius and armour abrasion are critical. Encapsulated sensors provide data on cable speed, cable length and cable tension. Companies requesting to see the complete set of design drawings will be asked to sign a confidential disclosure agreement.

### Variable Volume Sampler for Aerosols and Gases 8431

A method and apparatus to collect, for analysis, the solid or liquid particles in suspension in an aerosol. The technique is more efficient and simpler than the conventional "bubbler" or "impinger" techniques and it is suitable for a wider range of particle size and composition.

### Forced-draft Fire Drainage System 6256

This forced-draft ventilation system will effectively isolate and ventilate a fire in any part of a structure, e.g., a ship or a building. A system of ducts, fans and thermally actuated gates drains smoke and hot gases from the area of the fire and ensures fast-burning and highly localized fires which extinguish themselves after all the combustibles in the area have been consumed.

### Camera Lens Masks to Determine Co-ordinates 7992

A simple, compact and robust 3-D vision camera, with built-in multi-stripe projection device, provides real-time operation on objects moving at random undetermined speeds. The camera's dimensions are 10 x 5 x 5 cm. Its resolution range is one percent of the depth of view and,

unlike existing systems, it can be used under ordinary background illumination conditions which makes it suitable for a wide range of industrial robotics applications.

### Frequency Offset Diversity Receiver System 8024

This diversity receiver for digital minimum shift keyed (MSK) modulated mobile radio signals does not require many of the expensive subsystems commonly found in such receivers. It offers high quality, low error rate performance in circumstances where shadowing is a significant problem and channel bandwidth and power are constrained such as in UHF and VHF satellite communications systems.

### Particle Injection Device for Thermal Spraying 8116

This device controls the volume and speed of particles being injected into the plasma flame of a flame spray coating torch. Improved injection results in complete melting of the particles and produces a coating of more uniform thickness and better quality.

*For any of the offers listed above, write to:*  
Canadian Patents and Development Limited,  
275 Slater Street, Ottawa, Ontario K1A 0R3;  
Tel: (613) 990-6100.

*Please quote the appropriate case number.*

### Safety Helmet

A Canadian inventor wishes to sell outright the manufacturing and marketing rights to his invention, a blinking safety hat. It consists of a helmet with five lights operated by batteries inserted in the helmet. It is claimed that the lights can operate continuously for at least eight hours when conventional dry-cell batteries are used, and that an adapter may be used to connect to a power source, i.e., motorcycle or automobile or the dynamo of a bicycle.

*Write to:* R. Lahaie, 37 Hotel-de-Ville Street, Hull, Quebec J8X 2E1.



### Wood Furnace

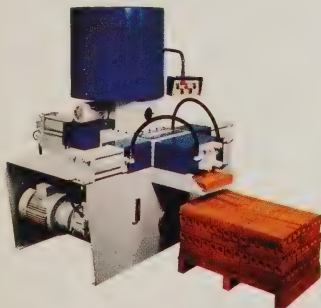
A group of university inventors is offering, through a licensing agreement, their invention, a new process of wood combustion which can obtain a high efficiency at high and low temperatures. The feeding chimney can hold enough wood to provide heat for up to 20 hours. The process is mainly based on controlling the circulation of gas using air entries that have particular shapes and locations.

*Write to:* Sylvain Desjardins, Co-ordinator, University-Industry Liaison Office, University of Sherbrooke, Sherbrooke, Quebec J1K 2R1; Tel: (819) 821-7840.

### Federal Republic of Germany

#### Waste Conversion Device

A joint venture, licensing or sale of patent agreement is offered for a multi-material, hydraulic briquetter for waste material. The compression system is not affected by foreign material and allows for two-way compression at the same time. *Write to:* Ingenieurbüro H. Reuss, Rütenbrocker Strasse 1, Postfach 3509, 4500 Osnabrück, Federal Republic of Germany.



#### Insulation Material

A licensing arrangement is offered for the manufacture of a new insulated building material which is permeable, waterproof and frostproof.

Low priced, it is suitable for basements, flat roofs, cold storage and rubbish pits.

*Write to:* Canadian Embassy, Commercial Division, Friedrich-Wilhelm Str. 18, D-5300 Bonn 1, Federal Republic of Germany.

#### Lead Recycling Process

Partners are sought for a joint venture, lead recycling pilot plant for recycling lead storage scrap and acids by wet electrochemical refining. The new process is said to eliminate emissions of poisonous materials.

*Write to:* Th Darmstadt, Institute for Chemical Technology, z.Hd. Herrn Prof. Dr. H. Wendt, Petersenstr. 20, D-6100 Darmstadt, Federal Republic of Germany.

#### Granulation Technology

A licensing arrangement is offered for a cost-effective direct granulation process for liquid blast furnace slag. No further granulation is required to produce ready-to-use construction materials.

*Write to:* Herrn E. Kerber, Marbachweg 332, D-6000 Frankfurt/Main, Federal Republic of Germany.

#### Long-life Engine

A company in the Federal Republic of Germany wishes to enter into a licensing agreement with a Canadian firm. The technology offered consists of a long-life combustion engine M-11, four-stroke, one piston, 250 cm<sup>3</sup>. The engine can be applied to power generators, pumps, conveyor belts, air compressors, small airplanes and boats and other uses.

*Write to:* Dr. Hans Juergen Schultz, Manager, Canadian-German Chamber of Industry and Commerce Inc., 2015 Peel Street, Suite 1110, Montréal, Quebec H3A 1T8; Tel: (514) 844-3051.

### France

#### Micrography

A French company wishes to enter into a licensing agreement with a Canadian company for its semi-automatic apparatus which duplicates films, called "DZ1 Diazo Duplicator". The company claims that it can recopy masters directly using a mercury lamp instead of a quartz cylinder, thus eliminating the risk of reproducing dust and

other defects on the duplicated film. The apparatus is claimed to have adjustable speed of between 200 and 2000 m/h.

*Write to:* M. Hannacart, C.M.M., 7, boulevard de Créteil, 94100 Saint-Maur, France; Tel: (33) 1.42.83.52.14.



#### Abattoir Waste Converter

A French company wishes to enter into a licensing agreement with a Canadian firm for the manufacture of its compost station which can convert in three days every kind of waste material produced by an abattoir into stable, homogeneous, odour-free fertilizer. This process treats directly all forms of waste, including offal, viscera, animal droppings, fluids, fats, blood and any other waste material, according to the needs of the abattoir.

*Write to:* COGEBIO, 74, rue du Rey, F-8 1100 Castres, France; Tel: (33) 63.59.33.96.

#### Bandage Cutting Devices

A French company is offering, through a licensing agreement, its devices for cutting bandages. The first is a new type of scissors for cutting gauze and other bandage material neatly. The second is a dispenser which dispenses and cuts bandages to the size required.

*Write to:* M J-P De Ruyter, Soguplast, 4, route d'Issenheim, 68500 Guebwiller, France; Tel: (33) 89.74.12.77.

### Pipe Supports

A French company is offering to Canadian firms, through a licensing agreement, the manufacturing rights for its wide range of pipe supports and miscellaneous accessories. The firm claims these supports are resistant to climatic and environmental changes.

*Write to:* Claude Bernard, Gérant, Societé Nicalex S.T., Champenoux, B.P. 53, 542 80 Seichamps, France; Tel: (33) 83.21.82.00.

### Robot Cleaner

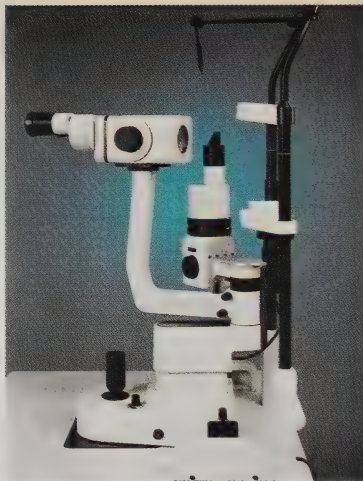
A French company wishes to enter into a licensing agreement for the manufacture of its robot which is used in cleaning ship's hulls and which can work above and below water. The firm claims the robot weighs 98 kg, is compact and can be used easily by untrained personnel. It can move forward or in a rotating movement and goes forward in steps of 1 cm to 40 cm at a speed of 150 m/hr. An articulate arm directs a rotating brush, which moves at an angle between  $-90^\circ$  and  $+90^\circ$ . The robot can perform a wide variety of tasks from removing algae from hulls to carrying out inspections by video.

*Write to:* Chantiers du Nord et de la Méditerranée, Etablissement de Dunkerque, Service CTE, B.P. 1503, 59381 Dunkerque Cedex 1, France; Tel: (33) 28.65.97.00.

### Filtration Systems

A French company is offering to Canadian manufacturers, through a licensing agreement, its technology for filtration systems. The systems consist of a silicon carbide base and patented ceramic membrane filters which can be applied to many areas, including: *agriculture*, in dairy ultrafiltration, protein extraction from lactoserum, and filtration of wine, fruit juice, beer and vinegar; *pharmaceuticals*, water purification, separation and sterilization; *electronics*, in separation of impurities to produce extremely pure solvents; and in *water treatment*. It is claimed that these filters can stand temperatures up to  $300^\circ\text{C}$  as well as various chemicals.

*Write to:* M Poidevin, R.P.S., 16, rue Demarquay, 75010 Paris, France; Tel: (33) 1.42.01.20.16.



### Optical Lamp

A French company wishes to enter into a licensing agreement with a Canadian firm for its product, a modular optical lamp specially adapted for lasers used in eye examinations. The firm claims that this multifunctional lamp can be an important tool during surgery. An electric command system can be added, if needed, as well as a dual-observation tube for an assistant or a photo/video camera. It also comes with a complete line of accessories.

*Write to:* Frank Morand, Laboratoires DOCI S.A., Z.A. Les Pradeaux, 13850 Greasque, France; Tel: (33) 42.58.85.68.

### Mini Drink Dispenser

A French firm wishes to enter into a licensing agreement with a Canadian company to manufacture its "Minimate", a hot and cold drink dispenser which can be operated manually or by coin.

*Write to:* F. E. Galopin, S. A. Polymat, 4, rue de l'Industrie, Monaco MC 98000, Monaco; Tel: (33) 93.50.89.53.

### German Democratic Republic

#### Buffing Process

A firm in the German Democratic Republic is offering to Canadian companies, through a licensing agreement, its technology for a thermal/chemical buffing (capping) process which increases the longevity of the buffer in buffing chambers used to polish semiconductors to extremely precise tolerances. The process operates in a reduced nitrogen atmosphere in the temperature range of  $280^\circ\text{C}$  to  $670^\circ\text{C}$  and in a pressure range of 0.1 to  $3.0\text{ Ncm}^{-2}$ .

#### Electrocardiograph

A company in the German Democratic Republic is offering to Canadian firms, through a licensing agreement, its technology for a six-channel electrocardiograph called "RFT Bioset BOS 6000". The firm claims the electrocardiograph is an advanced tool for use in intensive heart circula-

tion and angiological evaluation. It features all standard leads - Frank, Cabrera and Nehb, heart curve and sphygmogram. The unit's computer runs an automatic systems check of its functions and those of the analogue channels. Patient and recording data are printed alphanumerically along the edge of the chart printout. An accessory, the MS 6000, a two-channel oscilloscope, is offered for use with the Bioset BOS 6000. The MS 6000's two analogue time functions give users the choice of a still or moving display, instead of a printout.

*For the above two offers, write to:* Ogilvie Taylor & Associates Inc., 355-25L South End Avenue, New York, NY 10280, U.S.A.; Tel: (212) 912-0986.

### Japan

#### Ceramic Tiles

A Japanese company wishes to enter into a licensing or joint-venture arrangement with a Canadian manufacturer to fabricate ceramic tiles made of various waste materials through a moulding process followed by a "no-heat" treatment. The basic material is ceramics (30 percent by volume). This technique can also be used for the manufacture of roofing materials and the outer and inner walls of buildings. Mould patterns are available for various designs on the surface of the products. Any size and colour of these items are possible.

*Write to:* Hiroshi Kimura, Technology Information Section, Daiichi Enterprise Co., Ltd., Mitoko Building, 2-4, 6 Chome, Akaska, Minato-Ku, Tokyo 107, Japan; Tel: 03-582-0941.

### Switzerland

#### Self-service Car Wash

A Swiss company wishes to enter into a licensing or joint-venture agreement with a Canadian firm to manufacture its new self-service car wash system. The system is entirely pre-manufactured and can be erected in a building within a week.

*Write to:* EWI Electrowatt Engineering Services Ltd., Division Data Processing and Communications, Bellerivestrasse 36, CH-8008 Zurich, Switzerland; Tel: (1) 251.62.61.



# Requested

## Britain

### Health Care Products and Services

A British manufacturer of products used in hospitals wishes to acquire new products, through licensing agreements, in the following areas: medical disposables, anaesthesia, intensive care, sterilization, orthopedic instruments, orthopedic implants, surgical instruments, blood analysis, medical electronics, stoma care and incontinence (ref. 191/N/86).

*Write to:* J. D. Emanuel, Managing Director, Pax Technology Transfer Limited., 6 Donovan Avenue, London N10 2JX, England.

*Please quote the reference number.*

# Special Events

## Summary

### SWITZERLAND

- International Exhibition of Inventions and New Techniques  
Geneva – April 1987

### U.S.A.

- Annual High Technology R&D Trade Fair  
Arlington, Virginia – May 1987

### SINGAPORE

- AnalabAsia '87  
Singapore – May 1987

### FEDERAL REPUBLIC OF GERMANY

- International Trade Fair for Waste Disposal  
Munich – May 1987
- Ligna Hanover  
Hanover – May-June 1987

### AUSTRALIA

- Interbuild  
Melbourne – May 1987
- Meditex  
Sydney – June 1987

### CANADA

- 1987 International Mechanical Pulping Conference  
Vancouver – June 1987

### U.S.A.

- International Restaurant Hotel Suppliers Exposition  
Miami – September 1987

### HONG KONG

- International Food and Beverage Fair  
Hong Kong – September 1987

### CANADA

- Expocam  
Montréal – September 1987
- Electronicom '87  
Toronto – September 1987

### FEDERAL REPUBLIC OF GERMANY

- International Plastics Exhibition  
Friedrichshafen – October 1987

### U.S.A.

- International Marine Trade Exhibition  
Atlanta – October 1987

### SAUDI ARABIA

- Saudibuild '87  
Riyadh – October 1987

**International Exhibition of Inventions and New Techniques**

Palais des expositions  
Geneva, Switzerland

April 3-12, 1987

*Write to:* Salon international des inventions,  
8, rue du 31-Décembre, CH-1207 Geneva,  
Switzerland.

Tel: (022) 36.54.49.

**Annual High Technology R&D Trade Fair**

Hyatt Regency Crystal City

Arlington, Virginia

May 4-6, 1987

*Write to:* Technology Catalysts Inc.,  
6073 Arlington Boulevard, Falls Church,  
VA 22044, U.S.A.  
Tel: (703) 237-9600.

**AnaLabAsia '87**

**First Southeast Asian Laboratory and Analytical Technology and Equipment Show**

World Trade Centre  
Singapore, Singapore

May 13-16, 1987

*Write to:* UNILINK, 5 Donalda Crescent,  
Agincourt, Ontario M1S 1N5.  
Tel: (416) 291-6359.

**International Trade Fair for Waste Disposal**

Trade Fair Grounds

Munich, Federal Republic of Germany

May 19-23, 1987

*Write to:* Münchener Messe- und  
Ausstellungsgesellschaft GmbH,  
Postfach 121009, 8000 München 12,  
Federal Republic of Germany.  
Tel: (089) 51.07.0.

**Interbuild**

**The International Materials and Equipment Exhibition**

Royal Exhibition Building  
Melbourne, Australia

May 26-29, 1987

*Write to:* UNILINK, 5 Donalda Crescent,  
Agincourt, Ontario M1S 1N5. Tel: (416) 291-6359.

**Ligna Hanover**

**International Trade Fair for Machinery and Equipment for the Wood Industries**

Fairgrounds

Hanover, Federal Republic of Germany

May 27 - June 2, 1987

*Write to:* UNILINK, 5 Donalda Crescent,  
Agincourt, Ontario M1S 1N5.  
Tel: (416) 291-6359.

**1987 International Mechanical Pulping Conference**

Hotel Vancouver

Vancouver, British Columbia

June 2-5, 1987

*Write to:* W. Robert Wood, Deputy Manager,  
Technical Section, CPPA, Sun Life Building,  
23rd Floor, 1155 Metcalfe Street, Montréal,  
Quebec H3B 2X9.  
Tel: (514) 866-6621.

**Meditex**

**Australian Exhibition of Clinical/Surgical/Diagnostic Technology**

Sydney, Australia

June 15-18, 1987

*Write to:* Sue Baines, 162 Goulburn Street,  
BPI Exhibitions, Darlinghurst, Australia.

**International Restaurant and Hotel Suppliers Exposition**

Miami Convention Center

Miami, Florida

September 12-14, 1987

*Write to:* Saul Mandell, 14411 S. Dixie Highway,  
Suite 209, Miami, FL 33176, U.S.A.

**International Food and Beverage Fair**

Ocean Terminal

Hong Kong, Hong Kong

September 16-20, 1987

*Write to:* Karen Fifer, SHK International Services  
Ltd., 22/F 151 Gloucester Road, Wanchai,  
Hong Kong.

**Expocam**

Place Bonaventure

Montréal, Quebec

September 26-28, 1987

*Write to:* Jack McLean, Southex Exhibitions,  
1450 Don Mills Road, Don Mills, Ontario M3B 2R2.  
Tel: (416) 445-6641.

**Electronicom '87**

Metro Toronto Convention Centre

Toronto, Ontario

September 28-30, 1987

*Write to:* Scott Silcox, Southex Exhibitions,  
1450 Don Mills Road, Don Mills, Ontario M3B 2X7.  
Tel: (416) 445-6641.

**International Plastics Exhibition**

Friedrichshafen Fairgrounds

Friedrichshafen, Federal Republic of Germany

October 7-10, 1987

*Write to:* Hubertus Burgl, Intl. Bodensee-Messe  
GmbH, Messegelände 7990, Friedrichshafen,  
Federal Republic of Germany.

**International Marine Trade Exhibition**

World Congress Center

Atlanta, Georgia

October 16-18, 1987

*Write to:* Edward Conrad, Southern Exp.  
Management Co., 1150 Hightower Trail, Atlanta,  
GA 30338, U.S.A.

**Saudibuild '87**

**4th Building and Construction, Operations and Maintenance Show**

Riyadh Exhibition Centre

Riyadh, Saudi Arabia

October 18-22, 1987

*Write to:* UNILINK, 5 Donalda Crescent,  
Agincourt, Ontario M1S 1N5.  
Tel: (416) 291-6359.



# Regional Offices

**The Department of Regional  
Industrial Expansion maintains  
regional and local offices in each  
province for your convenience:**

## **Newfoundland**

Parsons Building  
90 O'Leary Avenue  
P.O. Box 8950  
St. John's, Newfoundland  
A1B 3R9  
Tel: (709) 772-4884  
Telex: 016-4749

### *Local Offices:*

#### **Corner Brook**

Tel: (709) 634-4477

#### **Happy Valley**

#### **Goose Bay, Labrador**

Tel: (709) 896-2741

## **Prince Edward Island**

Confederation Court Mall, Suite 400  
134 Kent Street  
P.O. Box 1115  
Charlottetown, Prince Edward Island  
C1A 7M8  
Tel: (902) 566-7400  
Telex: 014-44129

## **Nova Scotia**

1496 Lower Water Street  
P.O. Box 940, Station M  
Halifax, Nova Scotia  
B3J 2V9  
Tel: (902) 426-2018  
Telex: 019-22525

### **Entreprise Cape Breton:**

Sydney  
Tel: (902) 564-3614

## **New Brunswick**

770 Main Street  
P.O. Box 1210  
Moncton, New Brunswick  
E1C 8P9  
Tel: (506) 857-6400  
Telex: 014-2200  
*Local Offices:*

### **Bathurst**

Tel: (506) 548-8907

### **Fredericton**

Tel: (506) 452-3124

## **Quebec**

Tour de la Bourse, Suite 3800  
800 Victoria Place  
P.O. Box 247  
Montréal, Quebec  
H4Z 1E8  
Tel: (514) 283-8185  
Telex: 055-60768

### *Local Offices:*

#### **Alma**

Tel: (418) 668-3084

#### **Drummondville**

Tel: (819) 478-4664

#### **Québec City**

Tel: (418) 648-4826

#### **Rimouski**

Tel: (418) 722-3282

#### **Sherbrooke**

Tel: (819) 565-4713

#### **Trois-Rivières**

Tel: (819) 374-5544

#### **Val-d'Or**

Tel: (819) 825-5260

## **Ontario**

1 First Canadian Place, Suite 4840  
P.O. Box 98  
Toronto, Ontario  
M5X 1B1  
Tel: (416) 365-3737  
Telex: 065-24378

### *Local Offices:*

#### **London**

Tel: (519) 679-5820

#### **Ottawa**

Tel: (613) 993-4963

#### **Sudbury**

Tel: (705) 675-0711

#### **Thunder Bay**

Tel: (807) 623-4436

## **Manitoba**

330 Portage Avenue, Room 608  
P.O. Box 981  
Winnipeg, Manitoba  
R3C 2V2  
Tel: (204) 949-4090  
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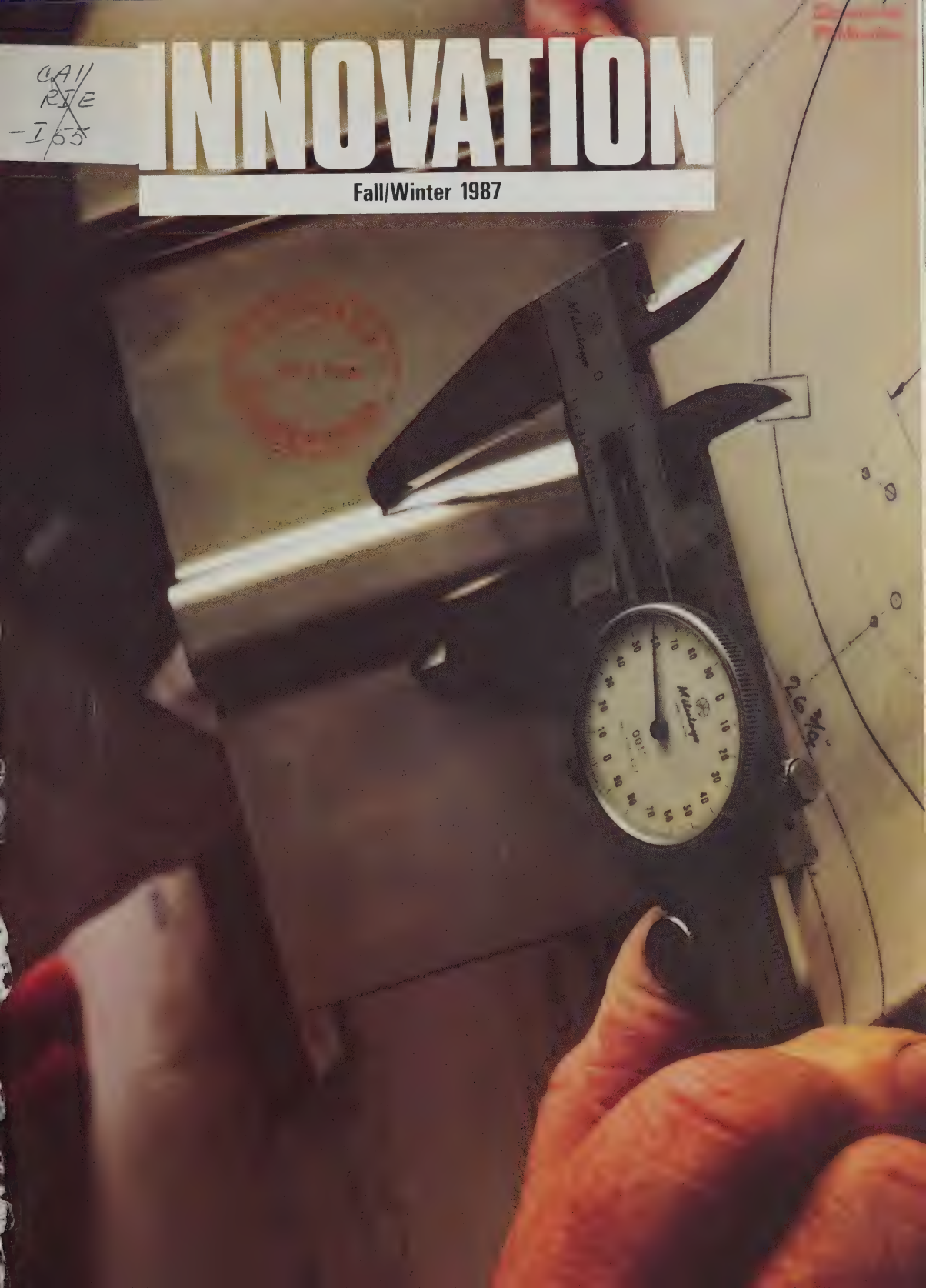
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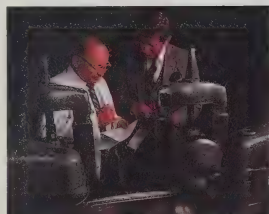
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# INNOVATION

Fall/Winter 1987

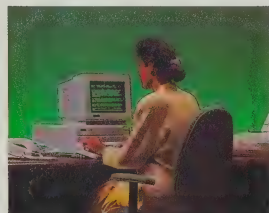


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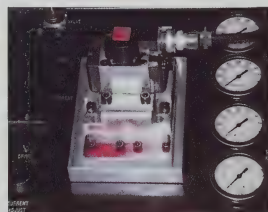


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## INNOVATION

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

INNOVATION, Technology Transfer Service (J011), Technology Liaison Directorate, Department of Regional Industrial Expansion, 235 Queen Street, Ottawa, Ontario K1A 0H5  
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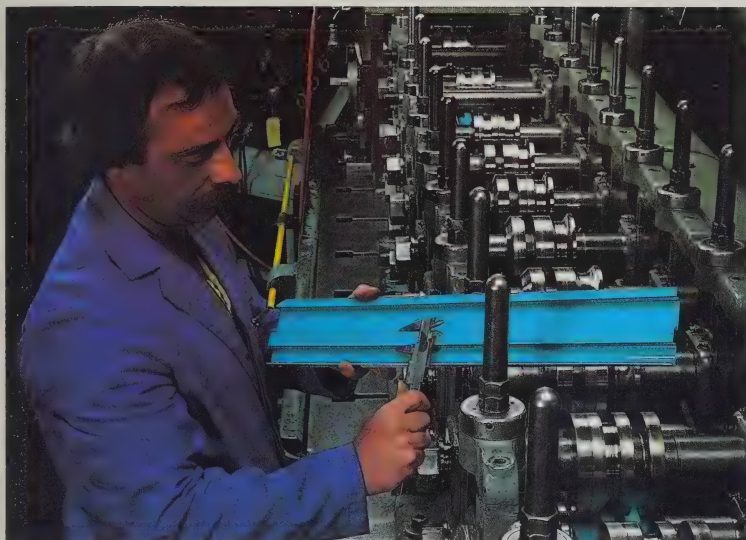
Telecom Canada p. 6, 7, 8

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Hon. Frank Oberle  
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Hon. Bernard Valcourt  
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## New Department Announced

Since the last issue of *Innovation*, the federal government has announced its intention to establish a new Department of Industry, Science and Technology to ensure the effective integration of advanced technology and competitive industries.

The new super ministry will help focus Canada's industrial strategy in the period leading up to the start of the 21st century. It will devise and pursue national industrial policies and strategic technologies. The department will both promote traditional industries and help establish and maintain the competitiveness of the new knowledge-based industries.

## Innovation's Role

Over the coming months, *Innovation* will continue to inform Canadian business of opportunities for technology transfer and of government and non-government assistance available to enhance technology, and to outline the development of the new Department of Industry, Science and Technology.

To help us do our job better, we need to know whether *Innovation* is getting through to its target audiences. With this issue, we have included a self-addressed subscription renewal card which, when filled in by you, will give us a much clearer picture of our readers. This information is extremely valuable to us as we plan future issues of the magazine.

Please help us serve you better. Fill in and return the reply card today. In addition, any suggestions or recommendations you may have to improve our publication will be welcomed.

## In This Issue

In a recent issue of *Innovation*, we examined a unique method of technology transfer developed by Harwill Technologies International and supported by both the Department of Regional Industrial Expansion and the National Research Council. This month we report on a visit to one of Harwill's clients, Cresswell Roll Forming Inc. of Granby, Quebec. This type of firm, i.e., machining, metal fabricating, etc., needed new techniques as well as new technology to stay competitive in an increasingly difficult marketplace.

While covering the Cresswell story, we found once again how important synergism is to the success of any endeavour — in this case the close working relationship the city of Granby has established with its industrial citizens.

For the small enterprising firm, busy with its everyday operations, finding technical solutions is often difficult. In this issue we cover Servo Technology Inc., a company which provides a wide range of services in the field of technology.

And if the entrepreneurs are women, the problem is compounded by the fact that, as a group, they do not have the well-developed support network that their male counterparts enjoy. This is the view of the Women Inventors Project which has been attacking this problem as its major *raison d'être*. Based in Waterloo, Ontario, the Project aims to establish support groups across the country.

And to prove once again that Canada takes a backseat to no one in the field of communications, we have a story on Telecom Canada, a world leader in many fields of inter-connection, voice messaging, voice and data management and remote CAD/CAM, to mention but a few of the R&D areas being pursued by this co-operative of Canada's leading phone companies.

Early this fall, the accomplishments of Canadian businesses, their management and employees were recognized at the fourth annual **Canada Awards for Business Excellence** ceremony in Halifax.

Of particular interest was the *Innovation* category, one of eight categories covered by the awards.

## The five award winners were:

- Clay-Mill Technical Systems Inc. (gold award), of Windsor, Ontario, for conceiving and creating a robotic automation system.
- Noranda Research Centre (silver award), of Pointe-Claire, Quebec, for the design and development of a gold leach refining process.
- Atomic Energy of Canada Limited's Radiochemical Company (bronze award), of Kanata, Ontario, for the development and commercialization of high purity Iodine-123 for medical diagnostic applications.
- Mobile Image Canada Limited (bronze award), of Toronto, Ontario, for the development of a process that adds colour to black and white movies for television programming.
- Nautical Electronic Laboratories Ltd. (bronze award), of Halifax, Nova Scotia, for the development and marketing of solid-state AM broadcast transmitters.

Three of the five awards in the *Small Business* category were also in the field of innovation.

- Medionics International Inc. (gold award), of Markham, Ontario, for the product innovation and marketing of peritoneal dialysis machines and related products.
- Rhodnius Incorporated (silver award), of Toronto, Ontario, for the development and marketing of relational data base software products.
- DSC Laboratories (bronze award), of Mississauga, Ontario, for product innovation in the audio-visual and television industries.



# Cresswell Roll Forming Inc., meets Granby

## Successful Technology Transfer Pilot Project Benefits Company and Community

**F**or the city of Granby and its Industrial Commissioner, Michel Lemelin, the project could not have come at a better time. The painstaking work and high costs of industrial prospecting were not paying off as they had in previous years.

Too many cities were chasing too few firms from cities, provinces, states and countries around the world.

A project designed to develop the art of industrial expansion right in their own back yard was tailor-made for Lemelin and Granby's mayor, Mario Girard, and the chance to participate was one they could not refuse.

The aim of the project was simple. Instead of seeking expansion by enticing new industries, it identified a dozen or more Granby companies in different sectors of the economy, such as metal processing, electrical products and plastics, which were contemplating expansion or which required new technology to remain competitive.

"What is the use of beating the bushes around the world in search of new industrial opportunities," says Michel Lemelin, "if we are going to lose existing firms because of neglect?"

This, of course, was the objective of this unique pilot project sponsored by the National Research Council, the Industrial Research Council of Quebec (CRIQ) and the Centre for Industrial Development of Granby.

Participating in the project through its agreement with the National Research Council's Industry Development Office was Harwill Technologies International (see Harwill story in *Innovation*, Winter 1986 issue), which is also carrying out a survey of Granby companies.

Harwill is assessing the positions of the target firms regarding their markets, production methods and the technologies they are now using.

"It is a matter of identifying managers who are open minded and ready to go forward and whose companies are contemplating expansion," explains Michel Lemelin.

One such company is Cresswell Roll Forming Inc., a cold roll forming firm that has been in business in Granby since 1941.

According to General Manager Richard Piédalue, "Over the years, Cresswell built up a reputation for high-quality product, on-time delivery and a competent engineering department. However, to meet new market requirements, our firm was facing diminishing returns on our investment.

"The market was demanding that we not only produce formed shapes but that we carry the manufacture of components through to the finished state. That included forming metal components to the customer's plans and specifications, including cutting and drilling. In other words, producing a product ready to be incorporated as-is into the customer's products.

"The development of these end-use products created no production problems for Cresswell. We had developed over 3000 die sets to manufacture a wide range of products and it was a simple matter to provide for drilling, slotting and cutting of the parts' final configurations.

"What we found difficult, however, was to add all these steps to the process and maintain a production schedule on which we could make money. Our high-speed roll formers had to be slowed down to allow us to perform these extra processes and our costs, due to reduced production, were such that profit margins were unsatisfactory.

"This left us with only two alternatives," Piédalue said. "Either we did not bid on this new business or we improved our technology and techniques to cope with the new situation.

"To follow the first would mean that our markets would become progressively smaller as more and more firms demand finished components to incorporate into their products without further machining. Or we could try to develop the new

technologies and procedures required to follow the second course.

"It was while we were contemplating our next move that Michel (Lemelin) told me of the new development project," Piédalue continued. "I had taken an interest in the Centre for Industrial Development of Granby and was a member with Michel on the centre's education committee.

"The education committee was set up to bring representatives from the local school boards, Granby industries and city officials together to study labour requirements in the area. Our aim was to provide both student counselling and curriculum advice so that the educational system could train a labour force with the necessary skills to fill Granby's needs.

"The project (suggested by Michel Lemelin) was tailor-made to our requirements," explained Cresswell's general manager. "It meant that a competent outside consultant would examine our operation without overloading our own staff. And, in the bargain, the consultant would assist us in finding suitable technology to overcome our problems.

"The fact that Harwill Technologies President Harvey Goodwin was our chief consultant was fortunate. On his recent trip to the U.K. and Europe, he was able to find the expertise and technology that, I am sure, will solve many of our output problems."

According to Harvey Goodwin, all his enquiries about roll forming expertise led to Ayrshire Metal Products, one of Britain's largest roll forming companies with three plants manufacturing over CDN\$40 million worth of product annually.

"And to make matters more interesting, Ayrshire had just completed a modernization of its plants to address the very same problem faced by Cresswell," Goodwin continued.

"As luck would have it, Martin Ockwell, Ayrshire's chief engineer, who piloted the entire project in the three plants, was available to come to Canada and assess the situation at Cresswell. We have completed this assessment and made recommendations to Cresswell's principals which have been accepted."

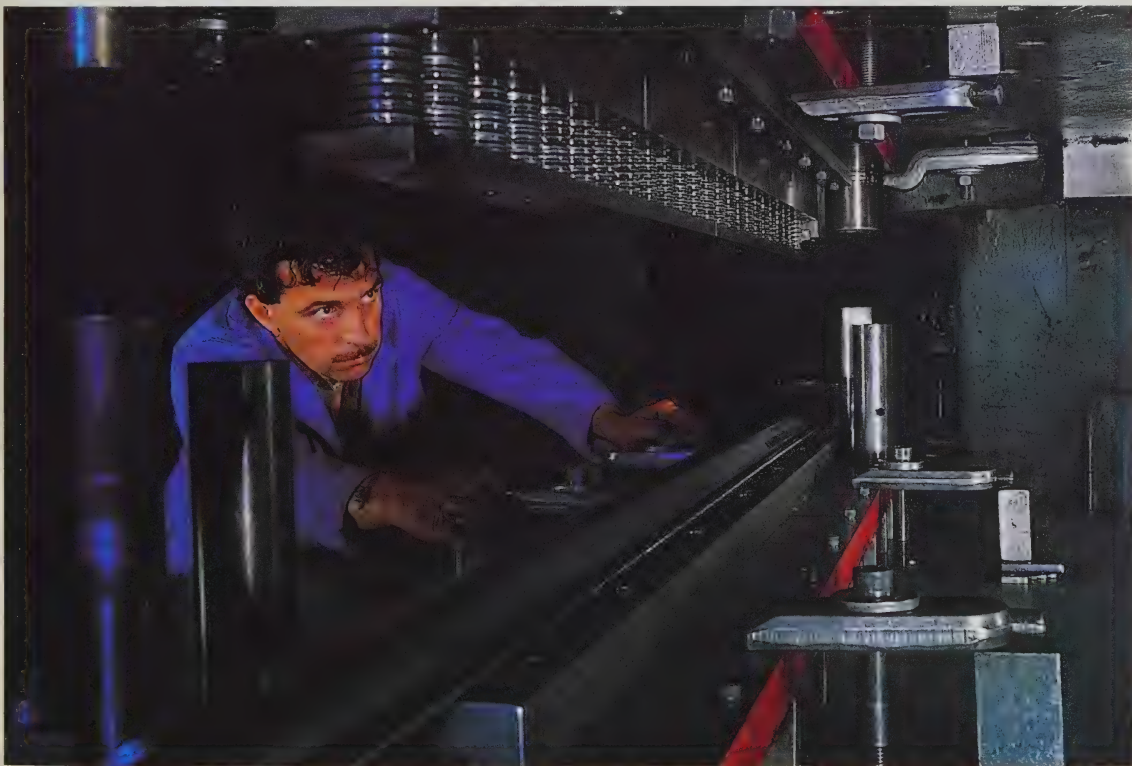
For Martin Ockwell, the chance to study a roll forming plant in a non-competitive market and, at the same time, make use of his recent hard-earned experience was a challenge he could not resist.

"I realized just what Richard (Piédalue) was facing," he said. "We had faced the same problems over the past few years. At the time we decided to do something about it, there were no guidelines or off-the-shelf technology available to assist us. We had to do all our own development through trial and error.

"I am sure we can avoid most of the pitfalls we encountered at Ayrshire in our upgrading of Cresswell's Granby operations. We have many pluses working to our advantage.

"First of all," Ockwell continued, "there is Cresswell's dedicated staff, both on the engineering side and the plant side. Unlike many occupations, metal forming is as much an art as a science. A good operator has, over the years, developed a finely tuned sense of what can be accomplished with a strip of metal.

A Cresswell employee adjusts forming presses to conform to specifications.



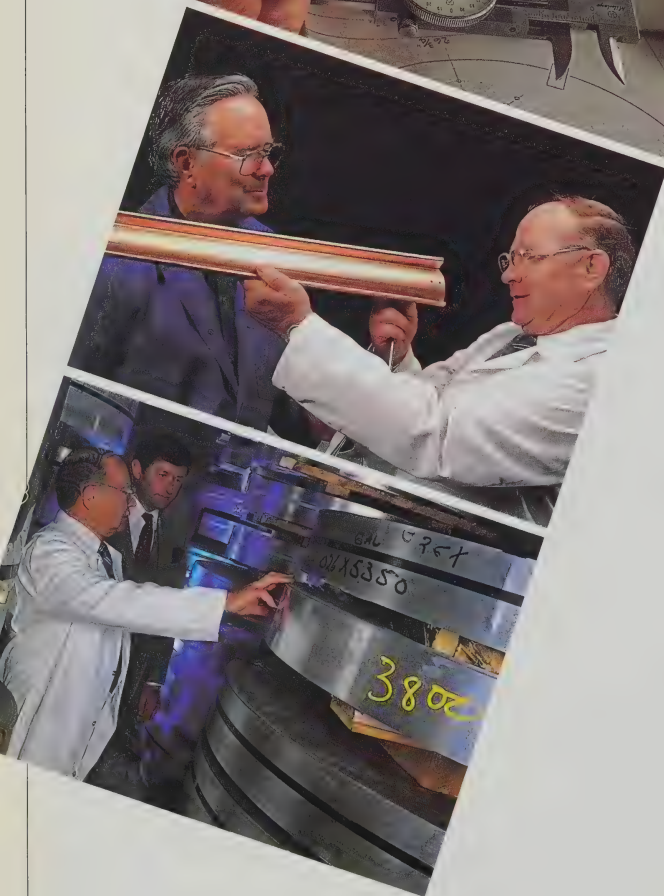
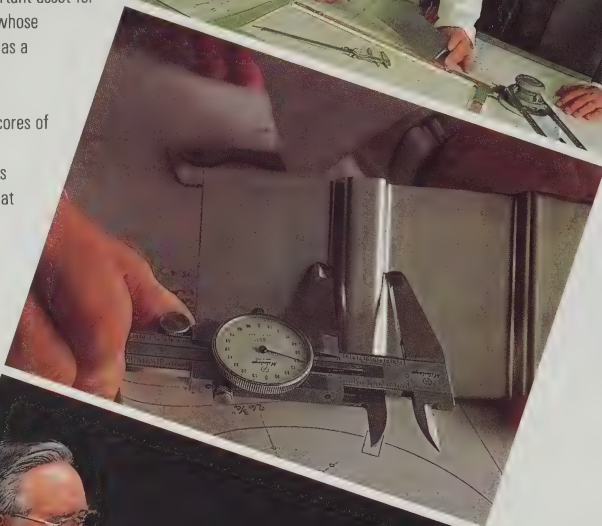


Customers' requirements are met through careful planning and CAD/CAM engineering.

Careful calibration assures top quality for the customer.

A good eye is an important asset for Cresswell employees whose work is an art as well as a science.

Hundreds of coils of scores of metal combinations, widths and thicknesses are the raw materials at Cresswell.



"Secondly, the plant has stayed on top of conventional developments in the metal forming trade. Its basic forming equipment is state of the art. And a third plus is, of course, its location.

"Granby is a lovely city in which to live," Ockwell noted, "close enough to Montréal to allow a person to follow a cosmopolitan lifestyle and rural enough to shelter one from the hectic pace of a larger centre. This, in turn, makes for a stable, satisfied workforce.

"While there's no off-the-shelf technology for the metal forming industry we found out at Ayrshire that our industry covered 25 technical areas from metallurgy to CAD/CAM (computer assisted design/computer assisted manufacturing).

"Although our market in the U.K. doesn't have the potential that exists here in Canada, what happened at Ayrshire gives a good indication of what to expect. When our modernization project started some years ago, it took 100 craftsmen to turn out 250 tons of product. Today, a staff of 45 at this same plant turns out 350 tons of product."

"From our point of view," added Cresswell's Piédalue, "we have to adopt new methods and technologies to survive. For example, our large formers can run at 200 feet a minute but we have had to slow them down to 35 feet a minute to produce a metal strut that requires accurate punching and cutting.

"Anything that lets us increase this speed substantially while maintaining quality will have a positive effect on our bottom line."

"This pilot project was designed to address bottom line results," Michel Lemelin commented.

"What is the value of chasing new industry, if we do not help our existing industries to cope with changing conditions?" he asked. "Stabilization of our industrial base is as important to us as uncontrolled growth. Over the years, we have become comfortable with our existing industries and they with us. We share a corporate philosophy that new industries might not understand or care to adopt."

For Granby's Industrial Commissioner, this project is just the latest in a long list of initiatives that Granby has used to overcome serious disruptions of its industrial base during the past several years.



Textiles, rubber and tobacco and Quebec's largest food and agricultural co-operative were long the mainstays of Granby's industrial base. But during the 1970s, the first three of these industries suffered a loss of more than a thousand jobs.

In a city of approximately 40 000, this was a major catastrophe. However, by rolling up their sleeves and going to work, the city and its dedicated staff have been able to find new jobs for many who had lost theirs in both existing and new industries.

That Mayor Mario Girard is proud of his city goes without saying. But it is a tradition in Granby.

The city of Peterborough is one of the first. At last account, Manager of Development Alex MacLeod and Director of Planning and Development Les Groombridge, a former president of Outboard Marine, Peterborough's largest industry, had visited Granby to study the project and try to adapt it to their circumstances.

According to Groombridge, "This is just the type of program we need that makes sense because it stresses liaison between the municipality and its industries.

"We see this approach as one which enhances

Huge forklifts transfer the metal coils from truck to storage and then to the individual presses.



A former mayor, Horace Boivin, who stepped down some years ago to become the city's first industrial commissioner, at 80 years of age still comes to the office every day. As head of public relations, he is Granby's greatest booster — a man who has roamed the world in search of the type of industry that would complement the city's lifestyle.

And what of the original project, designed to help retain Granby's industrial strengths? If imitation is the sincerest form of flattery, Granby will soon be joined by other Canadian cities anxious to adapt this type of project to their particular set of circumstances.

the ability of our industries to compete."

And it is this type of response that can be expected from scores of smaller cities from coast to coast in Canada.

For further information on the project, contact:  
Harwill Technologies International  
425 Gloucester Street  
Ottawa, Ontario  
K1R 5E9  
Tel: (613) 594-3299

# Telecom Targets Teleonomics Technology

Customers of Telecom's Megastream NMCS can display their existing network configurations and add, remove or change the speed of their circuits.



**S**ervice enhancements designed to strengthen companies' communications and information management systems place the member companies of Telecom Canada among the front-runners in teleonomics, the merger of telecommunications and computer technologies.

(Telecom Canada is an association of 10 major Canadian telecommunications firms: AGT, B.C. Tel, Bell Canada, Island Tel [P.E.I.], Manitoba Telephone System, Maritime Tel & Tel, NBTel, Newfoundland Telephone, SaskTel and Telesat Canada.)

Speaking at the annual conference of the Canadian Business Telecommunications Alliance (CBTA) in Montréal this fall, Robert White, Telecom Canada vice-president of business development, noted that teleonomics "has led to a vast range of new products, services and markets in this country."

Two of these, which he unveiled at the conference, are the Envoy Message Handling System (MHS) electronic messaging system, and Network Management and Control System (NMCS) which is offered as an enhancement to Megastream.

## Integrated Messaging

Envoy MHS is the first commercial, public system in the world incorporating the X.400MHS standard developed and ratified by the International Telegraph and Telephone Consultative Committee (CCITT). It provides a standard, computer-based interface between different electronic messaging systems, regardless of equipment type.

An enhancement to the Envoy 100 system, Envoy MHS will allow subscribers to communicate with users of the AT&T Electronic Mail Service and to access the worldwide users of the All-in-One Office Information Systems Service.

White noted that private system vendors such as IBM, CGE, Wang and Northern Telecom have also committed themselves to providing X.400-compatible products in the near future.

"The migration strategy has begun," he said.

X.400, he predicted, "will continue to provide a cost-effective solution to electronic messaging. It offers ease of use with a minimum of training, as well as increased revenues through the use of cost-saving networking considerations."

Experts in the teleonomics field seem to agree that X.400 will eventually permit multi-media messaging between carriers, he noted.



"And," he said, "it will lead to the integration of previously divergent forms, such as voice, data and graphics in the same network."

"Someday you might walk up to your desk, access your Envoy MHS and read a message that's been tagged with a voice annotation. Or, perhaps there is a graphics addendum to the note, in which case you might head off to a high-speed, graphics facsimile machine, or equivalent, and receive a print-out of your visuals."

### Managing the Network

The second new service enhancement announced by White at the CBTA conference, Megastream NMCS (Network Management and Control System), is an optional, PC-based system located on a customer's premises and dedicated to that customer's Megastream network.

(Megastream is a digital network service providing customers leased transmission capacity in increments of 64K bps to be used for transmitting voice, data and images over the same channels.)

"It allows customers to change network capacity by time of day," White noted. "For example, a customer could run voice trunks by day and wide-band data transfers between computers at night."

"The advantage here is that the demands of peak periods can be met without increasing one's overall capacity."

NMCS, he said, is aimed at customers with medium to heavy communications volumes, customers who have long expressed a desire for more direct control over their networks.

Network survivability, he noted, is critical to businesses that make thousands or even millions of transactions daily. "Incidents such as downtime, a return to manual services or even a fire can seriously threaten a company's operations."

To overcome these problems, Megastream NMCS customers will work with their member telephone company to develop a network "map" in advance so that, in the event of a breakdown in a Montréal data centre, for instance, all traffic normally terminating there could be temporarily re-routed to another location where spare Megastream terminating equipment is in place.

"The customer," said White, "then simply activates the recovery circuits through NMCS and resumes operations as usual."

### Voice Messaging

Another new service available from Telecom Canada is the Exten voice messaging system, designed to allow users to exchange "voice mail" from any Touch-Tone telephone in Canada or the continental U.S.

"With this service," White said, "each subscriber will have a personal voice mailbox. These mailboxes will work much like an internal mail system, allowing subscribers to drop off and pick up messages."

Subscribers will be able to dial up the Exten network, enter their identification code and instruct the service to act by entering the appropriate numbers on the telephone keypad.

With the service, subscribers will not only be able to send and receive messages, but to edit, save and forward other recorded information such as meeting agendas, sales reports and customer orders.

The service also will offer features allowing subscribers to set up "guest mailboxes" for non-subscribers, as well as mailboxes that receive and route customer orders for processing.

Through Telecom's Envoy MHS, electronic messaging subscribers have greater reach to other public and private messaging systems around the world.







Telecom's electronic data interchange (EDI) exchanges orders, invoices and other trade documents efficiently for greater sales volume, time savings and faster deliveries.

Other Exten features include the ability to flag an urgent message, and to send a message to a series of recipients by entering a two-digit code on the telephone keypad.

White said he realized some people will question the need for another telephone service in an era of personal computers and high-speed communications.

"Perhaps it is because, in such an era, the value of spoken information hasn't always been fully recognized. While the computer revolution has brought many benefits, I think most business people would agree that they still rely on the telephone for many of their day-to-day contacts.

"Over the phone we can negotiate, demand or persuade. We can provide moral support, encourage team spirit or just 'test the waters'. In other words, the telephone gives us the flexibility to relay feelings as well as facts."

#### **The Paperfree Marketplace**

Another Telecom Canada service, TradeRoute, is also making its contribution towards the paperless marketplace thanks to Electronic Data Interchange (EDI), the electronic exchange of business documents between two or more companies in an industry-standard format.

EDI has three main components:

- a message standard that defines the sequence and format of data to be exchanged;
- translation software that converts a company's internal language to an industry standard; and
- a communications network for sending and receiving information between companies.

Using this process, information usually transferred by paper will be sent between companies in an automated format.

Although EDI is still a relatively new phenomenon, it is predicted that, by 1990, 95 percent of Canadian companies will be saving a total of \$500 million a year by handling orders electronically. These savings will come through improved speed of delivery of business documents and improved accuracy due to the elimination of some steps in data entry.

"EDI is alive and moving through Canadian industry like greased lightning," said Marshall Spence, president of the Electronic Interchange Council of Canada.

#### **Digital Technology**

Taking a cue from the recording industry, Telecom Canada has brought digital technology to the world of teleconferencing with its TeleForum service.

TeleForum, like other teleconferencing services, allows three or more persons in different locations to meet electronically via the telephone network. However, the addition of digital technology means audio quality is improved, the mechanics of connecting callers is more flexible and the service can accommodate two people talking at the same time. (In the past, if one person interrupted another, as happens in normal conversation, the overlapping voice would be momentarily cut off.)

As well, TeleForum permits users to telephone out during a teleconference to speak with someone they may want to involve in only a portion of the meeting.

Security features allow the chairperson to lock the audio bridge, preventing any unwanted interruption in the call and protecting the confidentiality of a meeting.

For further information, please contact:  
Telecom Canada  
410 Laurier Avenue West, Room 1160  
Ottawa, Ontario  
K1P 6H5  
Tel: (613) 560-3030

# Maintenance of Pin-Point Control Problem Solved by Servo Technology

## Windsor firm brings calibration of servo-hydraulics equipment into the plant

A technician calibrates a servovalve right in the plant using bench-type equipment developed by Servo Technology.



**I**ncreasingly, manufacturers have been adapting servo-hydraulics to their manufacturing processes as a method of accurately controlling applied pressure for a wide variety of tasks. Servo Technology Inc. of Windsor, Ontario, has developed an in-plant method of maintaining that accuracy efficiently at the point of control — the servovalve.

A blending of electronic control and fluid power strength, servo-hydraulics is an important factor in robotics, boring mills, tube benders, flight simulators, electrical discharge machining (EDM) equipment and wood veneer processes.

The basic components of a servo-hydraulic system are a controller/amplifier, an error feedback system and the key element, the servovalve.

While servovalves are extremely accurate components, they are also highly susceptible to contamination, shock and excesses of heat, pressure and vibration. To maintain the required accuracy of servo-hydraulic systems, the valves must be serviced and recalibrated periodically at specialized repair houses and service centres.

Servo Technology Inc. was created to provide this service for Canadian servovalve users.

Out-of-plant recalibration, however, is a far from ideal answer to servovalve problems. Conditions vary from user to user and rapid custom calibration on-site is often required to minimize machinery down time.

Faced with this problem, Servo Technology developed a device that allows servo-hydraulic system users to calibrate, adjust and service most makes right at the machine. Known as a portable servo analyzer, it is available in several configurations and capacities to suit user needs.

Weighing only 16 kilograms, the analyzer can be moved easily by plant maintenance personnel from system to system, machine to machine. Large, workstation models are also available for systems users who wish to incorporate a full repair facility in their maintenance operations.

### Test results and capabilities claimed for the portable servo analyzer include:

- Flow rate and performance are now measured accurately under operating conditions.
- Quiescent flow, internal and spool leakage when current or voltage is zero, is monitored to reveal wear levels.
- Threshold, or the point at which the valve responds to signals to initiate flow, can be monitored.
- Hysteresis, the comparison of plus and minus input signal flow rates, now determines equalized performance.
- Null bias determines the amount of signal input required to achieve equilibrium.
- The valve's porting pressure is monitored to measure pressure gain.
- Null adjust, the external adjustment on every servovalve, is simplified with matched needle indicators.
- Connectors to an X-Y plotter have been built in to plot flow characteristics for a record of servovalve performance.
- As an option, an internal oscillator is available to run the servovalve automatically in a range from zero to 100 percent of the flow range to check stability.
- Full closed loop simulation systems are available in larger models to duplicate the actual systems in a plant.

All units operate at 120 volts and are easily attached to existing hydraulic systems with adaptor manifolds and flexible hoses. Hydraulic power units are also available.

For more information, contact:  
Servo Technology Inc., 2775 Kew Drive, Unit 5,  
Windsor, Ontario N8T 3B7; Tel: (519) 944-1332,  
Telex: 064-77918

## Women Inventors — An Underused Resource

**T**o encourage women to use their creativity in the development of patentable ideas and to assist them in development of marketable products based on these ideas" — these are among the goals of a successful, innovative and non-profit educational program for women inventors and potential inventors, the Women Inventors Project.

The project, backed by the Innovation Program of Employment and Immigration Canada, among other supporters, has been extended for at least five months from its original year-long life span. It is designed to encourage women to enter the male-dominated world of inventions and patents.

The extension will provide time to establish a women's network to carry on the project's goals.

**Co-directors of the Women Inventors Project are Shelly Beauchamp, left, and Lisa Avedon.**



A major milestone in this process is the publication of *The Book for Women Who Invent or Want To*, a 100-plus-page manual written in an up-beat, conversational style. Unique features are the emphasis on group learning and the advice on organizing self-help support networks.

Founded and directed by two women, Shelly Beauchamp, PhD, a biologist and technology analyst, and Lisa Avedon, MA, an adult educator with a special interest in women's learning, the project was promoted to backers on the premise that Canada was failing to use the inventive talents of half its population.

A study by Ms. Beauchamp, a technology assessment analyst with the Canadian Industrial Innovation Centre in Waterloo, Ontario, showed that only about one percent of Canadian patents were issued to Canadian women, according to Canadian Patent Office figures. In the United States, she found, the comparable figure is eight percent.

She also found that existing programs aimed at encouraging innovation have not been reaching women. For example, at the start of the women's program, they made up only five percent of the clientele in the Innovation Centre's Inventors' Assistance Program.

According to Ms. Beauchamp, "Initial results are encouraging. Since limited publicity on women inventors began one year ago, the proportion of women among Innovation Centre clients has doubled. This augurs well for the future because increased innovation is key to new business formation and to new jobs for Canadians.

"Women have been held back by a lack of money, information, recognition and support networks", she said, "and many have been put off by a lack of role models.

"However, through this project, we have identified a large group of talented and creative Canadian women. We have conducted two successful pilot workshops, at which women inventors from all over Canada shared their experiences and learned more about patenting, the building of prototypes, marketing and other aspects of new product development.

"This fall we have brought together 26 young women from local Waterloo high schools to test the school curriculum program we are developing," Ms. Beauchamp continued.





**Patsy Winger, inventor of the "Pacifinder", a device to hold a baby's pacifier in place.**

"And, of course, we have our resource manual and a video based on the experiences of the 51 women inventors and potential inventors attending our pilot workshops.

"While the project's staff and resources are too limited to help women inventors individually, we can help groups of women inventors to put on workshops in their own areas, based on our resource manual."

Among the more successful women inventors who participated in the Women Inventors Workshops were:

- Carolyn Gelhorn of Winnipeg, Manitoba, developed a sophisticated micro-electronic device for recording mileage and collecting trip data. She has set up her own company to market this device.
- Mary Harrison of Vancouver, British Columbia, developed, patented and licensed the "Phantom Cube". This is a teaching aid for radiographers which helps teach how to interpret two-dimensional images of three-dimensional objects. Ms. Harrison now receives royalties from the manufacturer on every cube sold.
- Chips Klein, president of Chipco Inc. in Guelph, Ontario. Ms. Klein invented, patented and is now marketing her "Eyemaker Mirror" in North America, Europe and Israel. The mirror features a unique design which helps with applying cosmetics or contact lenses by giving users top and bottom, as well as a straight on, views of the eye.

- Patsy Winger of Kitchener, Ontario, had two small children who were always losing their pacifiers. So she came up with the "Pacifinder", a bib-like device which holds the pacifier in place. Ms. Winger has filed for a patent on her product which is manufactured under contract and marketed by her own firm.

*The Book for Women Who Invent or Want To* covers all aspects of new product development with information on:

- evaluating your idea — can it fly?
- how to talk to professionals
- market research
- building a working model
- protecting your idea
- raising money
- the art of marketing
- packaging
- getting your ideas on the market
- planning.

The book is available at cost — \$10.00 — from:  
Women Inventors Project  
22 King Street South  
Waterloo, Ontario  
N2J 1N8

Tel: (519) 746-3443  
(Bulk rates available on request.)

# Technology Transfers

## Offered

### Canada

- Removal of Sulphur Dioxide from a Gaseous Stream
- Fabrication of Cellulose Acetate Membranes for Separating Hydrogen-Methane Gas Mixtures
- New Benzimidazole Fungicides
- Atomizing Nozzle Assembly
- Method and Apparatus for Inspecting Surfaces
- Method and Apparatus for Evaluating the Degree of Cure in Polymeric Composites
- Tent Liners/Walls for Cold Weather Use
- Wheels for Small and Medium Aircraft
- Coffee Creamer
- Plastic Coating
- Dynamic Air Deflector
- Exercise Bench
- Key Card

### Austria

- Central Garbage Disposal System

### Belgium

- Level Indicator and Transmitter
- Specialty Chemicals
- Nuclear, Bacteriological and Chemical Protective Suits and Equipment

### Federal Republic of Germany

- Mechanical Seal for Pumps
- Garage Door Opener
- Textile Bag-making Machinery

### France

- New Building Material
- Diagnostic Device for Foot-related Problems

### Great Britain

- Electric Motor/Generator
- All-terrain Tracked Vehicle

### Ireland

- Heavy-duty, Off-highway Transport and Handling Vehicles

### Italy

- Curing Systems for Ink and Varnishes for the Printing Industry

### Spain

- Mushrooms

### Sweden

- Roof Drainage System
- Metal Roofing System

### Switzerland

- Pump for Greasing Machinery, and Grease Cartridges
- Medical Apparatus for OPT Pictures

### U.S.A.

- "Security Eyes"
- Air Purifier for Motor Vehicles
- Digital Electronics Process Control Instrumentation
- Spacemaking Oak Bed

### U.S.S.R.

- High-strength, Acid-resistant Concrete

## Requested

### Canada

- Security Products and Systems
- Material-handling Equipment
- Industrial Cranes and Hoists

### Austria

- Recycling of Garbage

### Belgium

- Industrial Electronics
- Food Preservation Technologies and Machinery

### European Community

- Clothing
- Automotive and Agricultural Parts
- Paints and Varnishes

### Great Britain

- Filtration and Waste Disposal Technology

# Offered

## Canada

### Removal of Sulphur Dioxide from a Gaseous Stream 8115

A process for the capture-fixation of  $\text{SO}_2$  from flue gas, which utilizes an  $\text{MgO}$  aqueous slurry, is described. The magnesium salts from the first step are treated with  $\text{KCl}$  and  $\text{CaO.MgO}$  to produce potassium sulphate and calcium chloride which may be sold. The magnesium is recycled to reduce operating costs.

### Fabrication of Cellulose Acetate Membranes for Separating Hydrogen-Methane Gas Mixtures 8122

The process for manufacturing a cellulose acetate membrane with the required pore size is described. This membrane is capable of separating hydrogen gas from a mixture of hydrocarbon gases and hydrogen at a high permeation rate and a separation factor of 99.

### New Benzimidazole Fungicides 8141

A family of benzimidazole compounds which are particularly effective as fungicides against benomyl-resistant fungi, such as *Botrytis Cinerea*, as well as against benomyl-sensitive fungi.

### Atomizing Nozzle Assembly 8268

A special nozzle for burning a wide range of coal slurry fuels, featuring on-line orifice adjustment and thermal expansion protection is offered. The unique design of mixing chamber and nozzle rim provides excellent atomization at all orifice settings. A nozzle heat exchanger may be used to cool the nozzle or warm the fuel as required.

### Method and Apparatus for Inspecting Surfaces 8601

This instrument can be used to examine the shape of a three-dimensional reflective surface. It was specifically designed to improve automatic inspection of solder joints on printed circuit boards. It requires a relatively small amount of processing capacity and is faster and more reliable than existing automatic systems used for circuit board inspection.



### Method and Apparatus for Evaluating the Degree of Cure in Polymeric Composites 8610

A non-destructive method and apparatus for inspecting and monitoring the degree of cure in carbon-fibre-reinforced plastics and other thermoset polymers prior to, during and after processing. The technique can be used with a broad range of polymers, does not require sample penetration and provides a response within a short period of time.

### Tent Liners/Walls for Cold Weather Use 8797

This novel four-layer composite material is designed for tents used in cold weather. The new material offers increased comfort and reduced fuel consumption due to its increased thermal capacity. Condensation and frost accumulation is small.

*For any of the offers listed above, write to:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100. *Please quote the appropriate case number.*

### Wheels for Small and Medium Aircraft

A Canadian inventor wishes to enter into a licensing or joint-venture agreement with a Canadian company to fabricate his aircraft landing wheels. The inventor claims that this new wheel design reduces stress on landing gear, lessens wear on tires and improves landing comfort.

*Write to:* Ewen M. Maclean, 240 Lake Promenade, Apt. 217, Toronto, Ontario M8W 1B2.

### Coffee Creamer

A Canadian firm is offering to Canadian companies, through a licensing agreement, the rights to manufacture its oil-free, low-calorie, non-dairy coffee creamer for retail and food service applications. The product is reconstituted with water, blended, pasteurized and packaged. The licensee should have access to packaging equipment for the dairy industry.

*Write to:* Aubrey L. Abrams, Gibbons Foods, Division of Eden Manufacturing Co. Ltd., 95 Advance Road, Toronto, Ontario M8Z 2T2; Tel: (416) 231-4005, Telex: 06-967603.

### Dynamic Air Deflector

A Canadian firm is offering to Canadian manufacturers, through a licensing agreement, the rights to manufacture and sell its "Dynamic Air Deflector", a device which releases a fragrance if activated by forced air from heating or cooling systems. It comes in three fragrances: pine, powder and rose.

*Write to:* John R. Berardini, Edaya Enterprises Inc., 147 Medhurst Drive, Nepean, Ontario K2G 4J9; Tel: (613) 723-0963.

### Plastic Coating

A Canadian company engaged in plastic coating and resurfacing is interested in selling its process, equipment, coating materials and chemicals. In addition, the purchaser will have the right to use current and future technology relating to the process. This technology can be applied to a wide range of products.

*Write to:* Robert I. Campbell, Stuart Plastics Ltd., 7435 Lowland Drive, Burnaby, British Columbia V5J 5A8; Tel: (604) 437-5029.

### Exercise Bench

A Canadian inventor of a patented home exercise bench is offering to manufacturers the right to fabricate it under a licensing agreement. The inventor claims that the system offers 20 standard exercise stations, all in one. Compactness, universality and aesthetics are qualities attributed to the system.

*Write to:* George Kecala, 3508 West 17th Avenue, Vancouver, British Columbia V6S 1A1; Tel: (604) 738-1044.

### Key Card

A Canadian inventor wishes to enter into a licensing agreement, a joint venture or outright sale of patent with a Canadian manufacturer to fabricate his "Key Card", a plastic card, similar to a credit card, which can store two keys.

*Write to:* Universal Advertising Inc., 22 Livingston Place, Winnipeg, Manitoba R3T 3T5; Tel: (204) 261-4945.

## Austria

### Central Garbage Disposal System

An Austrian company wishes to enter into a joint venture with a Canadian company for the production of its central garbage disposal system designed for large buildings such as hospitals, offices, commercial complexes and hotels.

*Write to:* Dr. Monica Maicen, The Austrian Trade Commission, 2 Bloor Street East, Suite 3330, Toronto, Ontario M4W 1A8; Tel: (416) 967-3348, Telex: 06-23196 AUSTRAD TOR.

## Belgium

### Level Indicator and Transmitter

License available for various markets for a new instrument for the measurement of level, densities, interfaces and viscosity of liquids based on the patented stress transducer principle which is claimed to be revolutionary. The instrument can be used for all measurement instrumentation applications on liquid reservoirs.

*Write to:* L. Van De Pas, Director R&D, EGEMIN N.V., Bredabaan 1201, B-2120 SCHOTEN, Belgium; Tel: (32) 3-645.27.90, Telex: 32525.

### Specialty Chemicals

A Belgian firm is offering, through joint-venture or licensing arrangements, its technology related to all types of sealants, polyurethane foam, adhesives and roofing products for the building industry in general.

*Write to:* D. Coorevits, Soudal Chemicals N.V., Everdongenlaan 18-20, B-2300 TURNHOUT, Belgium; Tel: (32) 14-42.42.35, Telex: 31626.

### Nuclear, Bacteriological and Chemical Protective Suits and Equipment

A Belgian firm is offering, through a licensing arrangement, its technology for the manufacture of air-permeable protective suits and all other equipment used in chemical warfare such as NBC casualty bags. It also offers its technology for theatre tarpaulins, water decontamination units and other technology.

*Write to:* Jean-Pierre Seynaeve, SEYNTEX N.V., Seyntexlaan 1, B-8880 TIELT, Belgium; Tel: (32) 51-40.24.24, Telex: 81947.

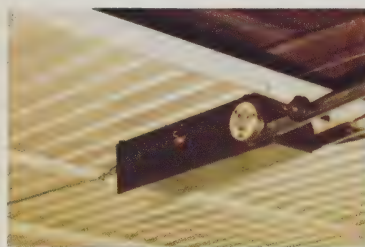


## Federal Republic of Germany

### Mechanical Seal for Pumps

A West German, who owns the Canadian patent rights to a mechanical seal for pumps and agitators, wishes to contact interested Canadians. It is claimed that the seal has applications in the chemical and pharmaceutical industries and can be used with nearly all products at high temperatures (up to 200°C) allowing a high degree of standardization of pump equipment.

*Write to:* Dipl.-Ing. Rainer Ch. Schlegel, Albanstrasse 18, D6234 Hattersheim 1, Federal Republic of Germany; Tel: 06190/2892.



### Garage Door Opener

A West German inventor is offering to Canadian manufacturers, through a licensing agreement, the rights to fabricate his garage door opener. The inventor claims his opener is 70 percent cheaper to produce, weighs about 6 kg and is easy to install.

*Write to:* Wilhelm Altroggo, Postfach 1101, 4937 Lage, Federal Republic of Germany.

### Textile Bag-making Machinery

A West German engineering firm wishes to enter into a licensing or joint-venture agreement with a Canadian company to manufacture its textile bag-making machine. Based on electric-pneumatic self-controls, it can process all types of plastics, textiles and polymerides — both lightweight and heavy — into bags for various applications, at a production rate of from 14.4 to 79.8 per minute. The production unit includes automatic measuring, cutting, folding, sewing and stapling.

*Write to:* Thomas Spicker, Canadian Consulate General, Immermannstrasse 3, D-4000 Dusseldorf, Federal Republic of Germany; Tel: (011-49-211) 35.34.71, Telex: 41-8587144 (DM CN D).

## France

### New Building Material

A French inventor is offering to Canadian companies, through a licensing or joint-venture arrangement, a new honeycomb building material shaped like a bird's nest. This material, known as "NIDA", comes in an unusual shape that is a viable alternative to traditional materials. Its surfaces are perpendicular to the plate. It is ideal for use in the automotive, electronics and construction industries and in sports equipment, according to the inventor.

*Write to:* Isabelle Chassin, Centre français de promotion des coopérations technologiques et industrielles, 20 Elgin, C.P.218, Place Bonaventure, Montréal, Quebec H5A 1A9; Tel: (514) 861-8471.

### Diagnostic Device for Foot-related Problems

A French firm is offering to Canadian manufacturers, through licensing or joint-venture arrangements, its electronic podometer which has a highly sensitive artificial skin to provide faster, more detailed and accurate diagnosis of foot-related problems. The device can be used in orthopedics, podiatry, podiatrics, neurology and biokinetics.

*Write to:* M. Petijean, Podiatric Diffusion, Rue Benoit Fourneryon, B.P.14, 42161 Andrezieux-Boutheon, France; Tel: (33) 77.55.41.94, Telex: 307 022F; or to: Mrs. Manon Larose-Bennett, Information Bureau on Technologies from France, 210 Dundas Street West, Suite 800, Toronto, Ontario M5G 2E8; Tel: (416) 977-2587.

## Great Britain

### Electric Motor/Generator

British inventors and designers of variable speed/torque electric drives offer to Canadian firms the rights to manufacture their line of switched reluctance motors and generators ranging in size from a few watts to several megawatts.

*Write to:* S.R. Drives Ltd., Design and Consultancy Services, Springfield House, Hyde Terrace, Leeds LS2 9LN, United Kingdom; Tel: 0532-443844.

### All-terrain Tracked Vehicle

A British company is offering Canadian firms, through a licensing agreement, the rights to fabricate in Canada its "Hytracker", an all-terrain, tracked vehicle. The vehicle is claimed to have both civilian and military applications under a wide range of conditions and formats, including two- or three-person cab, 14-person cab and tipper body, etc., and to have a pay load of 2123.5 kg.

*Write to:* Dudley Smith, Whitley, Smith Limited, Suite 304, 224 Merton Street, Toronto, Ontario M4S 1A1; Tel: (416) 480-1766, Telex: 06-218255.

## Ireland

### Heavy-duty, Off-highway Transport and Handling Vehicles

An Irish manufacturer of shunting road/rail locomotives, with expertise in design and manufacture of heavy-duty, off-highway transport and handling



equipment, is offering access to its technology through licensing, joint-venture or other arrangements.

*Write to:* Unilokomotive Ltd., Mervue Industrial Estate, Galway, Ireland; Tel: 353-91-57034/5, Telex: 50113 (ULOK EI).

## Italy

### Curing Systems for Ink and Varnishes for the Printing Industry

An Italian firm is offering, through a licensing agreement, its technology related to ultra-violet curing systems for inks and varnishes in the printing industry. Applications for the system are in the fields of serigraphy, offset, labelling, printing and graphics as well as printed circuits.

*Write to:* L. R. Poisson, Canadian Consulate General, Via Vittor Pisani 19, 20124 Milan, Italy; Tel: (02) 6570451, Telex: 310368 CANCON.

## Spain

### Mushrooms

A Spanish processor of canned mushrooms is offering to Canadian firms its technology for growing and canning mushrooms. The method also includes the production of mushroom spores.

*Write to:* M. F. Crawcour, Canadian Embassy, Apartado 117, 35, Nunez de Balboa, 28001 Madrid, Spain; Tel: (91) 431-4300.

## Sweden

### Roof Drainage System

A Canadian subsidiary of a Swedish company is offering, through a licensing agreement, its technology for a roof drainage system which is claimed to be suitable for all types of roofs.

*Write to:* Michael Danakody, Kody Enterprises Ltd., Box 187, Maple Ridge, British Columbia V2X 7G1; Tel: (604) 467-6125, or Fax 467-1032.

### Metal Roofing System

A Swedish company is offering to Canadian firms, through a sale of patent rights, its technology for a sheet-metal roofing system which is adaptable to retrofitting as well as for new construction with a slope as low as 1:75. The system consists of sheet-metal panels which are rolled to full length in two

standard widths: 600 mm and 880 mm. No end splices are necessary. The firm claims that the system can cope with difficulties associated with leakage, condensation and ice-damming.

*Write to:* Mats Jalar, SPEKON AB, Innergatan 17, 942 00 Älvsbyn, Sweden; Tel: 46-929-12544 or 46-929-70089.

## Switzerland

### Pump for Greasing Machinery, and Grease Cartridges

A Swiss firm is offering to Canadian manufacturers, through a licensing agreement, the rights to manufacture in Canada its hand pump for greasing machinery, and its grease cartridge. The firm claims that this is a new concept, that grease in bulk, ordinary grease cartridges or flexible bags can be used, and that each of its components is interchangeable.

*Write to:* D. Chablaix, Avenue du Grey 76, CH-1018 Lausanne, Switzerland; Tel: 021 36 35 40.

### Medical Apparatus for OPT Pictures

A Swiss firm is offering Canadian manufacturers a license to fabricate in Canada medical apparatus which complements tomography or orthopan-tomography by taking congruent OPT pictures.

*Write to:* Dr. Vera Delnon, Winzerhalde 16, CH-8049 Zurich, Switzerland; Tel: 01/56.70.20.

## U.S.A.

### "Security Eyes"

An American inventor is offering to Canadian firms the manufacturing and marketing rights to his "Security Eyes", a device that is installed at the front of a car and connected to the front wheel or the steering mechanism. The device emits beams or rays, adjustable to weather conditions, which warn the driver of approaching objects. It gives four warnings — turning on a warning light, turning off the flow of fuel, lightly activating the brakes and finally stopping the vehicle completely.

### Air Purifier for Motor Vehicles

An American inventor is offering to Canadian firms the manufacturing and marketing rights for a combination air purifier and filter. This device consists of a pollution cleansing system installed in the motor

vehicle vent system. It is also equipped with a sensor that warns the driver that the filter needs to be replaced.

*For both of the above, write to:* T. Kowalczyk, 8163 Lochdale, Dearborn, Michigan, MI 48127, U.S.A.; Tel: (313) 274-4933 (after 7 p.m.).

### Digital Electronics Process Control Instrumentation

An American company, owner of the property rights for over 50 product lines in the digital process control instrumentation field, wishes to license out to Canadian manufacturers the exclusive rights to these products.

*Write To:* Alex Dely, International Microtronics Corp., 4016 East Tennessee Street, Tuscon, Arizona, AZ 85714, U.S.A.; Tel: (602) 748-7900.

### Spacemaking Oak Bed

An American designer of an oak bed wishes to grant a license to a Canadian firm for the production of its "Nadsack", a modular sleeping/storage concept. It is claimed to have many advantages over similar combinations and to be easy to assemble.

*Write to:* GN Alternatives, P.O. Box 99, Route 107, Bethel, Vermont, VT 05032, U.S.A.; Tel: (802) 234-5676.

## U.S.S.R.

### High-strength, Acid-resistant Concrete

A Russian company is offering Canadian firms, through a licensing agreement, its technology covering a high-strength, acid-resistant concrete which can be used in columns, cross-bars, beams, slabs and foundations, as well as acid-proof tanks, pickling and electrolysis baths, wells and reservoirs.

*Write to:* Igor L. Vornov, Technology Licensing, Amtorg Trading Company, 750 Third Avenue, New York, NY 10017, U.S.A.; Tel: (212) 972-1220.

# Requested

## Canada

### Security Products and Systems

A Canadian company wishes to acquire, under a licensing agreement, security products and systems to be used in metal doors in residential and commercial buildings.

*Write to:* John Patterson, KMD Kelowna Metal Door, 1659 Cary Road, Kelowna, British Columbia V1X 2C1; Tel: (604) 860-2206.

### Material-handling Equipment

A Canadian manufacturer of material-handling equipment (forestry, marine and construction), with engineering, drafting and design capabilities, is seeking products to manufacture in its plant. A licensing or joint-venture arrangement is being sought.

*Write to:* Gregory Ramsay, Ramsay Machine Works, Ltd., 1630 Store Street, Victoria, British Columbia V8W 1V3; Tel: (604) 384-5314 or 385-1113.

### Industrial Cranes and Hoists

A Canadian company involved in the manufacture of industrial cranes and hoists, with a wide foreign market network, wishes to enter into a licensing or joint-venture arrangement with other Canadian or foreign manufacturers to produce new products complementary to its present product line.

*Write to:* Stewart Corbert, Bonneau & Assoc. Inc., 2011 Halpern, Ville-St-Laurent, Quebec H4S 1T3; Tel: (514) 331-7040 or 331-9303, Telex: 05-824-806.

## Austria

### Recycling of Garbage

An Austrian firm wishes to acquire, under a licensing agreement, new technology related to the recycling of garbage.

*Write to:* Dr. Monica Maicen, The Austrian Trade Commission, 2 Bloor Street East, Suite 3330, Toronto, Ontario M4W 1A8; Tel: (416) 967-3348, Telex: 06-23196 AUSTRAD TOR.

## Belgium

### Industrial Electronics

A Belgian firm wishes to acquire new technologies related to electronics for industrial applications with special interest in the fields of electrical vehicles, hoisting and farm machinery.

*Write to:* D. De Winter, Vluchtenburgstraat 3, B-2630 Aartselaar, Belgium; Tel: (32) 3-887.30.41, Telex: 72574.

### Food Preservation Technologies and Machinery

A Belgian firm wishes to acquire technology in the field of food preservation through sterilization and other methods. Any type of business arrangement will be considered.

*Please quote reference number 087-245 in correspondence with:* Piet Desiere, c/o GOMOV, Floriapaleis bus 6, B-9000 Gent, Belgium; Tel: (32) 91.21.55.11.

## European Community

### Clothing BRE/9299/44

A Spanish manufacturer of clothing for children and young adults wishes to share technology and product with a Canadian company.

### Automotive and Agricultural Parts BRE/9369/31

A Portuguese firm, fabricating automotive and agricultural parts and products, wishes to enter into a joint-venture agreement with a Canadian manufacturer to make semi-elliptic springs.

### Paints and Varnishes BRE/9602/49

A Spanish firm, manufacturing paints and varnishes, wishes to acquire new technologies and markets either through licensing, joint-venture or other type of arrangement.

*For the requests above, please quote the reference number when writing to:* Commission of the European Communities Task Force, Small and Medium-Sized Enterprises, 80, rue d'Arlon, Bte 1 (6th Floor), B-1040 Brussels, Belgium; Tel: (2) 230.39.49/230.40.91, Telex: 61655 BURAP.

## Great Britain

### Filtration and Waste Disposal Technology

A British process engineering and equipment firm wishes to acquire, through a licensing agreement, new technologies and products in the following areas: new filtration and membrane systems applicable to either upstream or downstream separations; waste processing equipment; municipal and hazardous waste separation; disposal processes and systems including incineration.

*Write to:* Dr. Roger Penney, Strategic Innovations International Limited, 3 Union Street, Bedford MK40 2SF, England; Tel: (0234) 40622, Telex: 825633 S11.



# Special Events

## Summary

### U.S.A.

- 43rd Annual Composite Institute Conference  
Cincinnati, Ohio — February 1988

### SINGAPORE

- 7th Offshore South East Asia Conference and  
Exhibition  
Singapore — February 1988

### U.S.S.R.

- Reclama '88  
Moscow — February 1988

### INDIA

- Wisitex '88  
Bombay — February 1988

### U.S.A.

- Licensing Executives Society U.S.A./Canada,  
Western Regional Meeting  
Phoenix, Arizona — February 1988

### DENMARK

- Copenhagen International Boat Show  
Copenhagen — February 1988

- Mikrodota '88  
Copenhagen — February 1988

- Building '88  
Fredericia — February 1988

### CANADA

- 3rd Canadian Shipbuilding and Offshore  
Exhibition  
Montréal — February 1988

### FEDERAL REPUBLIC OF GERMANY

- Imprinta '88  
Dusseldorf — February 1988

### FRANCE

- Mecanolem  
Paris — February-March 1988

- Expobois '88  
Paris — March 1988

- Simodec '88  
La Roche-sur-Foron — March 1988

### U.S.A.

- International Automotive Aftermarket Show  
Las Vegas, Nevada — March 1988

- Interface '88  
Chicago, Illinois — March 1988

### U.S.S.R.

- Physiologiya '88  
Tbilisi — March 1988

### DENMARK

- Rejs '88  
Copenhagen — March 1988

- Metal '88  
Fredericia — March 1988

### UNITED ARAB EMIRATES

- 3rd Arabgas and Oil Technology Exhibition  
Dubai — March 1988

### MALAYSIA

- Defence Services Asia Exhibition and Conference  
Kuala Lumpur — March 1988

### ITALY

- Fiero Milano  
Milan — April 1988

### CANADA

- Licensing Executives Society U.S.A./Canada,  
Canada Regional Meeting  
Ottawa — April 1988

### U.S.A.

- 90th Annual American Ceramic Society  
Exposition  
Cincinnati, Ohio — May 1988

- AEC Systems '88  
Chicago, Illinois — May 1988

### FRANCE

- Intermedica '88  
Paris — May 1988

### ITALY

- Miad '88  
Milan — May 1988

### U.S.A.

- International Pulp Bleaching Conference  
Orlando, Florida — June 1988

- International Machine Tool Show  
Chicago, Illinois — September 1988

### PEOPLE'S REPUBLIC OF CHINA

- C.I.P. '88  
Beijing — September 1988

### U.S.A.

- Instrument Society of America  
Houston, Texas — October 1988

- Licensing Executives Society U.S.A./Canada,  
Annual Meeting  
Marco Island, Florida — October 1988

### INDONESIA

- Forestry and Woodworking Indonesia '88  
Jakarta — October 1988

### CANADA

- 1988 Environment Conference  
Vancouver — October 1988

### U.S.A.

- Wescon  
Anaheim, California — November 1988

#### **43rd Annual Composite Institute Conference**

Cincinnati Convention Centre

Cincinnati, Ohio, U.S.A.

February 1-5, 1988

*Write to:* Gary F. Grates

Gibbs & Soell, Inc.

126 East 38th Street, New York, NY 10016, U.S.A.

*Tel:* (212) 481-4488

#### **7th Offshore South East Asia Conference and Exhibition**

World Trade Centre

Singapore

February 2-5, 1988

*Write to:* Unilink

5 Donald Crescent, Agincourt, Ontario M1S 1N5

*Tel:* (416) 291-6359

#### **Reclama '88**

#### **Specialized International Exhibition of Equipment for the Manufacture of Advertising Aids**

Moscow, U.S.S.R.

February 3-10, 1988

*Write to:* P. R. Charette Inc. (Nowea)

5890 Monkland Avenue, Suite 206

Montréal, Quebec H4A 1G2

*Tel:* (514) 489-8671

#### **Wisitex '88**

#### **5th World Instrumentation and Industrial Electronics Symposium and Exhibition**

Nehru Centre

Bombay, India

February 4-10, 1988

*Write to:* P. R. Charette Inc. (Nowea)

5890 Monkland Avenue, Suite 206

Montréal, Quebec H4A 1G2

*Tel:* (514) 489-8671

#### **Licensing Executives Society U.S.A./Canada, Western Regional Meeting**

Arizona Biltmore

Phoenix, Arizona, U.S.A.

February 12-13, 1988

*Write to:* Joan Trysgstad

Rexnord Specialty Fastener Division

3000 W. Lomita Boulevard

Torrance, California, CA 90505, U.S.A.

*Tel:* (213) 530-2220

#### **Copenhagen International Boat Show**

Bella Center

Copenhagen, Denmark

February 1988

*Write to:* Bella Center A/S, Center Boulevard

DK-2300 Copenhagen S, Denmark

*Tel:* (01) 51 88 11

#### **Mikrodata '88**

Bella Center

Copenhagen, Denmark

February 20-24, 1988

*Write to:* Bella Center A/S, Center Boulevard

DK-2300 Copenhagen S., Denmark

*Tel:* (01) 51 88 11

#### **Building '88**

Dr. Margrethe Hallen

Fredericia, Denmark

February 24-27, 1988

*Write to:* Dr. Margrethe Hallen

DK-7000 Fredericia, Denmark

*Tel:* (05) 92 25 66

#### **3rd Canadian Shipbuilding and Offshore Exhibition**

Queen Elizabeth Hotel

Montréal, Quebec

February 15-16, 1988

*Write to:* Mrs. Joyce MacPherson

Canadian Shipbuilding and Ship Repairing Association

P.O. Box 1429, Station B

Ottawa, Ontario K1P 5R4

*Tel:* (613) 232-7127

#### **Imprinta '88**

5th International Congress and Exhibition for Communications Techniques

Dusseldorf, Federal Republic of Germany

February 18-24, 1988

*Write to:* P. R. Charette Inc. (Nowea)

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Montréal, Quebec H4A 1G2

*Tel:* (514) 489-8671

#### **Mecanelem**

#### **International Exhibition of Mechanical Components and Systems for Machine Construction**

PARIS-NORD Villepinte, France

February 29 - March 5, 1988

*Write to:* Promosalons, Progexco C.P.

911 Place Bonaventure, Dollard I

Montréal, Quebec H5A 1E7

*Tel:* (514) 861-7841

*or to:* Promosalons, French Trade Exhibitions

210 Dundas Street West, Suite 800

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210 Dundas Street West, Suite 800

Toronto, Ontario M5G 2E8

*Tel:* (416) 977-7320

**Simodec '88****International Cutting Machinery (Machine Tool) Industry**

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*Tel:* (514) 861-7841

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210 Dundas Street West, Suite 800  
Toronto, Ontario M5G 2E8  
*Tel:* (416) 977-7320

**International Automotive Aftermarket Show**

Las Vegas, Nevada, U.S.A.  
March 2-4, 1988

*Write to:* Gary Huffaker  
Pacific Automotive Show  
P.O. Box 9288  
Van Nuys, California, CA 91411, U.S.A.  
*Tel:* (818) 376-0014

**Interface '88**

McCormick Place  
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March 28-31, 1988

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300 First Avenue  
Needham, Massachusetts, MA 02194, U.S.A.  
*Tel:* (617) 449-6600

**Physiologiya '88****Specialized International Exhibition of Scientific Apparatus for Biomedical Research**

Tbilisi, U.S.S.R.  
March 11-18, 1988  
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Montréal, Quebec H4A 1G2  
*Tel:* (514) 489-8671

**Rejs '88****Scandinavian Travel and Tourism Exhibition**

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Copenhagen, Denmark  
March 1988

*Write to:* Bella Center A/S, Center Boulevard  
DK-2300 Copenhagen S, Denmark  
*Tel:* (01) 51 88 11

**Metal '88****International Machine Tool Exhibition**

Dr. Margrethe Hallen  
Fredericia, Denmark  
March 22-26, 1988

*Write to:* Danske Fagmesser ApS  
Tordenskjoldsgade 27  
DK-1055 Copenhagen, Denmark  
*Tel:* (01) 14 00 10

**3rd Arabgas and Oil Technology Exhibition**

Dubai International Trade Centre  
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March 20-24, 1988  
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29, Dering Street, London W1R 9AA,  
United Kingdom  
*Tel:* 01-499 7774

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**Fiera Milano**

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April 16-24, 1988  
*Write to:* Delia Associates  
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Whitehouse, New Jersey, NJ 08888, U.S.A.  
*Tel* (toll free): (800) 524-2193

**Licensing Executives Society U.S.A./Canada, Canada Regional Meeting**

Delta Ottawa  
Ottawa, Ontario  
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Swabey, Mitchell, Houle, Marcoux & Sher  
1001 de Maisonneuve Boulevard West, Suite 800  
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*Tel:* (514) 845-7126

**90th Annual American Ceramic Society Exposition**

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McMaster University  
Hamilton, Ontario L8S 4L7  
*Tel:* (416) 525-9140

**AEC Systems '88**

Chicago, Illinois, U.S.A.  
May 2-5, 1988  
*Write to:* AEC Systems  
190 Eagle Drive  
Newington, Connecticut, CT 06111, U.S.A.  
*Tel:* (203) 666-1326

**Intermedica '88****2nd International Exhibition of Biomedical and Hospital Equipment**

Paris, France  
May 26-30, 1988  
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Montréal, Quebec H5A 1E7  
*Tel:* (514) 861-7841  
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210 Dundas Street West, Suite 800  
Toronto, Ontario M5G 2E8  
*Tel:* (416) 977-7320

**Miad '88****International Exhibition for Confectionery and Bakery Products**

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May 7-11, 1988  
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*Tel* (toll free): (800) 524-2193

**International Pulp Bleaching Conference**

Orlando, Florida  
June 5-9, 1988  
*Write to:* David Paterson  
Technical Section, CPPA  
Sun Life Building, 23rd Floor  
1155 Metcalfe Street  
Montréal, Quebec H3B 2X9  
*Tel:* (514) 866-6621



**International Machine Tool Show**

Chicago, Illinois, U.S.A.

September 7-16, 1988

*Write to:* National Machine Tool Builders Association

7901 Westpark Drive

McLean, Virginia, VA 22102-4269, U.S.A.

*Tel:* (703) 893-2900

**C.I.P. '88****International Packaging Equipment and Technology Exhibition**

Beijing, People's Republic of China

September 9-15, 1988

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Montréal, Quebec H4A 1G2

*Tel:* (514) 489-8671

**Instrument Society of America**

Houston, Texas, U.S.A.

October 16-20, 1988

*Write to:* Instrument Society of America

67 Alexander Drive, P.O. Box 12277

Research Triangle Park

North Carolina, NC 27709, U.S.A.

*Tel:* (919) 549-8411

**Licensing Executives Society U.S.A./Canada, Annual Meeting**

Marco Island, Florida, U.S.A.

October 27-29, 1988

*Write to:* Michael Carpenter

POMS, SMITH, LANDE & ROSE

1888 Century Park East, Suite 1000

Los Angeles, California, CA 90067, U.S.A.

*Tel:* (213) 277-8141

**Forestry and Woodworking Indonesia '88**

Jakarta, Indonesia

October 18-22, 1988

*Write to:* Unilink

5 Donalda Crescent

Agincourt, Ontario M1S 1N5

*Tel:* (416) 291-6359

**1988 Environment Conference**

Hyatt Regency Vancouver

Vancouver, British Columbia

October 25-27, 1988

*Write to:* David Paterson

Technical Section, CPPA

Sun Life Building, 23rd Floor

1155 Metcalfe Street

Montréal, Quebec H3B 2X9

*Tel:* (514) 866-6621

**Wescon**

Anaheim, California, U.S.A.

November 15-18, 1988

*Write to:* Electronic Conventions Management

8110 Airport Boulevard

Los Angeles, California, CA 90045, U.S.A.

*Tel:* (213) 772-2965

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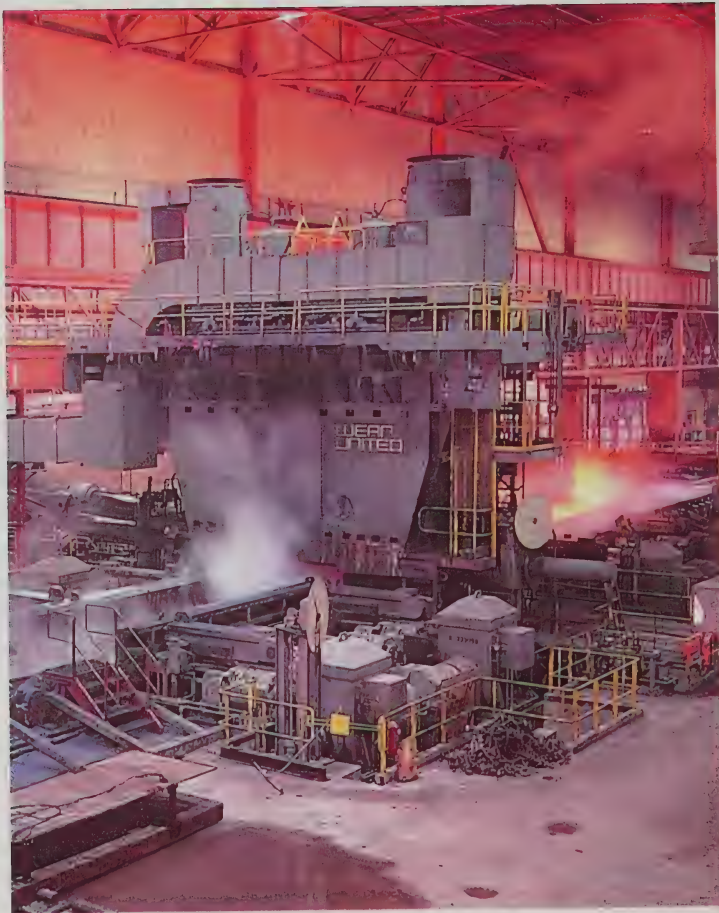
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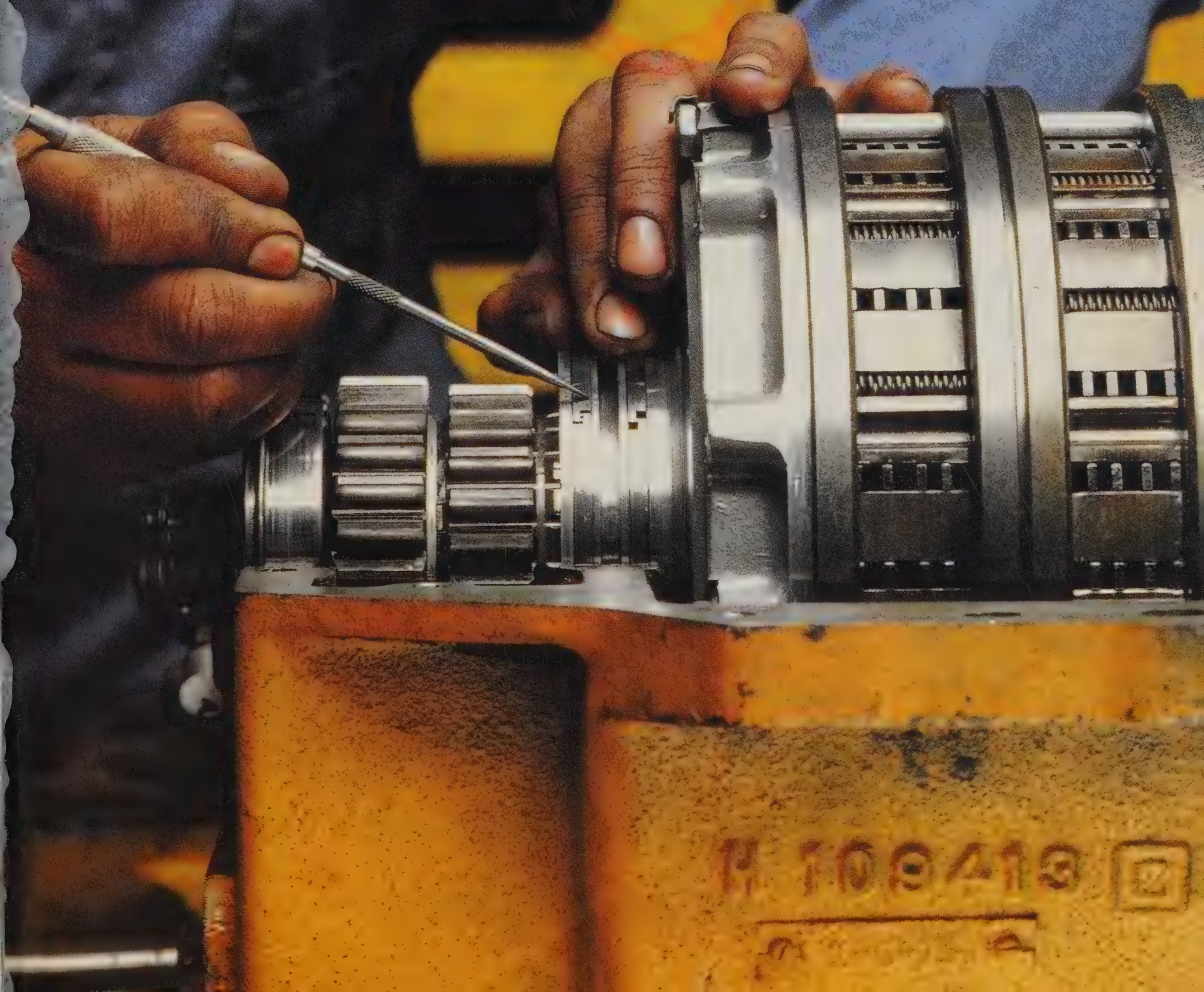
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# INNOVATION

Fall 1988



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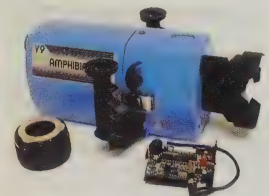
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## INNOVATION

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

INNOVATION, Technology Transfer Service (JOLI), Technology Liaison Directorate, Industry, Science and Technology Canada, 235 Queen Street, Ottawa, Ontario K1A 0H5  
Tel: (613) 954-3458

Hon. Robert R. de Cotret  
Minister of Regional Industrial Expansion  
Minister of State for Science and Technology

Hon. Frank Oberle  
Minister of State (Science and Technology)

Hon. Bernard Valcourt  
Minister of State (Small Businesses and Tourism)

(Également publié en français)





**O**ver the past few months, senior management of the Department of Regional Industrial Expansion (DRIE) and the Ministry of State for Science and Technology (MOSST) have been working on the myriad of details required to establish the new Department of Industry, Science and Technology (ISTC).

A complex undertaking at the best of times, the development of a new department in the face of fiscal restraint and changing business environment is even more inherently difficult.

As a result of governmental directions, reflected in the enabling legislation tabled in the House of Commons, the new department will feature some marked changes in emphasis, and a sharpened and enhanced focus. The department will:

- place increased emphasis on policies affecting the business climate with a special emphasis on innovation and on the particular needs of specific sectors;
- develop and deliver policies, programs and services in close co-operation with industry;
- take steps to strengthen its expertise and information base in industry sectors and technology;
- take special care to address the problems and concerns of small and medium-sized business, and of developing entrepreneurs.

The new legislation reflects the many initiatives announced in recent months by the government, for example, InnovAction – a greater emphasis on leading edge technologies such as biotechnology, advanced materials and artificial intelligence. It also places renewed emphasis on assisting small and medium-sized firms develop the capability to find, adapt and apply technology.

The establishment of the Atlantic Canada Opportunities Agency (ACOA) and the Department of Western Economic Diversification (DWED) has reduced the proposed new department's role in regional development funding of programs, although under the minister and quite distinct from its main responsibilities it will be administratively involved in regional development in regions of Ontario and Quebec and among Canada's native population.

A number of Canada-wide programs will continue to be a part of the new department's mandate, including the Defence Industry Productivity Program (DIPP) and the Technology Outreach Program (TOP). The department will also continue to deliver programs, such as the Program for Export Market Development (PEMD), delivered by DRIE for External Affairs.

However, in the future there will be more emphasis on non-monetary assistance to all segments of industry, and a greater focus on co-operative efforts to meet the challenges in science and technology. This will ensure that research, development and technology application in all sectors (government, industry and academic) will be carried out to the best advantage of all Canadians.

NATIONAL RESEARCH COUNCIL SCIENTISTS have found a new method to render high levels of polychlorinated biphenyls (PCBs) safe for disposal. The method neutralizes PCBs by removing the chlorine from the toxic chemicals which were used as lubricants, insulators and cooling agents as well as additives to rubbers, paints, waxes and asphalts.

The new method allows the chemicals to be transported from their storage site safely and burned at a much lower temperature with no risks to the environment.

TO ENCOURAGE SASKATCHEWAN YOUTH to take a greater interest in science and technology, the province will open Saskatchewan Science Centre at an old electrical generating plant in Regina's Wascana Centre.

THE NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL has announced its Steacie Fellowships for 1988. The fellowships allow scientists and engineers to work full time in their field of research while they are still at a relatively early stage of their careers.

This year's winners are:

- Dr. Scott D. Tremaine, University of Toronto astrophysicist whose predictions of the existence of ring-shepherding satellites were confirmed in spectacular fashion by the Voyager satellite.
- Dr. W. G. Habashi, Concordia University, whose work has helped Canada set a world standard in aviation technology.
- Dr. Kenneth R. Davidson, University of Waterloo mathematician who is recognized as one of the world's leaders in the area of mathematics known as Operator Theory.
- Dr. Spencer C. Barrett, University of Toronto plant biologist whose work has led to a better understanding of plant mating behaviour and of the mimicry of crop plants by weeds.

IN KEEPING WITH GOVERNMENT PRIORITIES, NRC's Division of Biological Sciences has joined with industry, universities, hospitals and other government agencies to carry out major research projects including:

- improved fermentation and enzymatic processes to make useful products or eliminate wastes;
- novel techniques for the development of better diagnostic and therapeutic agents; and
- unique methodologies for the characterization and modification of proteins for enhanced utility.





## Transporting Ideas into Reality

transport



An aging population and the push for more access to services by the handicapped prompted the development of this wheel-chair elevator for inter-city busses.

**C**anada's little-known Transportation Development Centre, with headquarters in Montréal, was established 18 years ago and has been responsible for the implementation of hundreds of ideas for more efficient and safer methods of transport.

It's a classic problem! You've come up with a brilliant invention that could save millions of dollars — or, perhaps, thousands of lives. But where can you go to get the idea launched?

If your idea has anything to do with transportation, including marine and air technology, or with transporting the elderly and handicapped, there's one organization specifically set up to deal with such ideas — the Transportation Development Centre (TDC).

Established by Transport Canada in 1970, TDC's mandate is to study, promote and manage the application of science and technology towards a safer, more efficient and effective Canadian transportation system. It encompasses all stages of the innovation cycle — from initial concept through prototype and demonstration to final deployment.

Based in downtown Montréal, TDC was involved in 320 projects with a total value of \$16.8 million during its 1986-87 fiscal year, all under the supervision of around two dozen professional engineers.

But while the bulk of its contracts goes to bigger corporations and universities, TDC is fully prepared to deal with smaller, start-up operations, or even one-person shops.

"The road to commercialization of a product is generally long and costly," says TDC executive director Ted Rudback. "We can help at the early stages by playing a key part in the concretizing and development of ideas." However he adds a rider: "But innovators can't necessarily depend on us to carry them all the way through."

"We don't sell our services," explained senior research officer Trevor Smith. "If a university or private contractor or a provincial government or even a private individual — any member of the transport community — would like to undertake a project where the risks are too high, they can come to us directly."

Depending on the nature of the proposal, the company itself could be contracted to do the work, or TDC could issue an invitation to other parties to undertake it.

"The real work is managing contracts and making sure work paid for by the taxpayer is delivered," said Smith.

TDC's core research and development budget was recently doubled to around \$9 million. This amount is augmented by cost-sharing contributions from other federal departments, industry, the provinces and universities.

"Once a major commercial potential is seen," said Rudback, "we ask the company to put up part of the required financing — generally 50 percent. If it is not commercial but Transport Canada needs it, we will do it without the question of cost. So very often it's a judgment call."

"Also, if your project is of sufficient interest to the transport industry, you could get 100 percent. But we think we are pretty fair negotiators."

While the public may become aware of some major projects that TDC has been involved in — such as the *MV Arctic's* operations, the B.C. Rail electrification program or the UTDC light rail company (now owned by Lavalin) — there are literally hundreds of other innovations initiated through the centre that are eventually implemented with little or no fanfare.

"We're a small high-tech company now just on the verge of selling our products in Canada and elsewhere," says Gerald Bachmeyer, of Oracle Communications Inc., in Burnaby, B.C. "Without TDC, we would be a lot further behind."





The development of scale models and prototypes are necessary prerequisites to the development of new products in the transportation field.

Those products include a multi-media integrated transportation information system, now being used experimentally in Vancouver; a parking advisory system that has been sold to Seattle Tacoma Airport; and a speech synthesis device that enables up-to-the-minute weather information for pilots to be composed for broadcast direct from teletype.

"The difficulty of so many products geared towards the transportation area is that at some point they have to go before some government authority or other before a sale can be made," says Bachmeyer.

"I believe TDC really takes its mandate seriously. It was instrumental in providing us with seed funding, in some cases up to the prototype stage. In other cases, TDC actually helped demonstrate and implement our products in transit or air traffic control.

"All these steps are critical for a small company. It's different if you're IBM, with its own R&D resources, but if you're small, each stage is really critical in getting a product ready that the community would buy. After demonstrating a product, TDC can take the position that if it works, a transit agency should buy it. That's happening for us now as a result."

Someone with similar sentiments is designer Uwe Rutenberg of Dorval, Quebec. He has conceived a variety of equipment to help disabled and elderly people board transit vehicles, as well as a communication system to help impaired persons obtain information on transportation facilities.

"We are working in a very specific area — dealing with the handicapped — and for us it is a tremendous advantage to have an outfit like TDC," he says. "Because of the limited market, few companies have the resources to take their products to the market stage. Therefore a concern like the TDC is very helpful."

A company currently installing one of Rutenberg's designs — a wheelchair lift integrated into an inner-city bus — is TES Ltd. of Ottawa, a major TDC contractor for many years. Says Laurin Garland, TES president: "There are many concepts we have come up with that TDC worked on to make marketable.

"Our mandate is to do research and development in transportation, so obviously there is a very close match in our aims and objectives and it's natural that we end up doing a lot of work with them. To a large extent we have focused on the elderly and disabled because, as changing demographics show, we are getting more and more elderly and government agencies are becoming more interested." TES, which is 13 years old, now employs 60 people and has a turnover of \$6 million.

TDC's initial work on the design of high-capacity intercity buses at first met with little success, as often happens. "When we first came up with the idea in 1978, the Canadian companies didn't see any need for it," says senior TDC development officer Brian Marshall.

"So, in co-operation with Voyageur, we brought in a German-built articulated bus for testing. Although this bus turned out to be unsuited



to the Canadian environment, the seed was planted. Prévoist Car Inc. of Ste-Claire, Quebec, picked up on the idea and, with the help of funding from the Department of Regional Industrial Expansion, developed a new, technically advanced design. The first production units are just starting to come off the line now.

"Our involvement has come full circle. We are again working with Voyageur on an articulated bus demonstration — but this time it is an all-new Canadian technology," Marshall continued. "Twelve of the new Prévoist 'artics' will be operating on the Québec-Montréal run from October, in a two-year demonstration."

TDC is also working with Canada's other intercity bus manufacturer, Motor Coach Industries (MCI) of Winnipeg. Under negotiation is a project to build the prototype of a "stretched" version of current 14.5-m (40-ft.) designs, incorporating results of previous TDC work on accessibility.

"This could become the new industry standard," claims Marshall. "If MCI undertakes this development in Canada rather than at its U.S. plant, it should ensure the future of Winnipeg as a major design centre and production facility for the North American market."

In a different line of work is software engineer Archie Bowen, president and chief executive officer of Ottawa-based CompEngServ Ltd. With TDC aid, he has devised a computer-based expert system to help air traffic controllers resolve conflicts in sparsely used air space. Another expert system will be used to locate electro-magnetic radio frequency interference.

"I've been pushing this technology for some time," says Bowen, who is also a professor at Carleton University. "When I started, about five years ago, this type of work in Canada was almost unknown — a wasteland." Through Transport Canada, he was put in touch with TDC, where "what they do always has an element of risk".

From "a nice little shop", CompEngServ has grown to eight employees, with another seven to be hired by the summer, he reports.

Another inventor who, through TDC aid, has seen his initial concept go through to a product now being marketed is Dick Neumann, of Pointe Claire, Quebec. His Chameleon is a convertible flatbed/dry bulk trailer that permits trucks carrying such products as grain, sugar and cement in one direction to make their return with a general cargo payload.

"He put in an Unsolicited Proposal to the Department of Supply and Services — which is a very useful way of approaching us," says TDC's Rudback. "The idea itself was not new. What made it possible is new materials technology."

The TDC project manager, Lewis Sabounghi, says Neumann has entered into an agreement with Westank, of Regina, to manufacture the product for the Canadian market and the first unit is to run with Trimac Corp., a major Canadian trucking company.

"The Chameleon has turned out to be the most famous project of TDC across the world, and hundreds of requests for information come weekly from as far as Australia, Europe, Zimbabwe and Brazil," claims Sabounghi.

Ling Suen, TDC chief of research analysis and special programs, says that, in the contractual process at the TDC, "we're conscious of the regional distribution. We do not discriminate — contractors are chosen on the basis of merit. Some projects, which require only brain work and not facilities, do give a lead to small contractors since scientific expertise sometimes depends on only one individual. Knowledgeable individuals can set themselves up as a one-person firm and be able to win some TDC R&D contracts on a competitive basis."



It's test, adjust, change — test, adjust, change at every stage of the development of new ideas.



Computer simulation is an important tool in visualizing the steps required to bring ideas from conception to final implementation.

*Specially prepared for Innovation by Brian Ostroff and Huguette Guilbaumon, Ottawa-based freelance writers concentrating on the fields of new business applications and high technology.*

# Canadians Score With Robotics

## Vadeko — Making its Mark in Space

**A** Canadian high-tech firm that specializes in system engineering is making a name for itself in space. Vadeko International, Inc., of Mississauga, Ontario, has been awarded a contract by Morton Thiokol, a major U.S. space project contractor, to design and build the software and control system for a robotic arm used to inspect and trim the solid fuel in a rocket.

Vadeko has built its reputation in the design and development of electro-mechanical systems and is actively involved in space programs. Now, with the software contract for the Morton Thiokol robotic arm already awarded, the company is bidding on a further contract to build the actual arm, to Morton Thiokol design.

### Problem Solvers

"We go where the problems are," is the way Eric Chinn, Ottawa-based director of planning and development for Vadeko, describes his company's work.

Vadeko staff reflect this dedication. For example, H. J. Taylor, a senior partner, is a prominent space pioneer who recently received a Ministry of State for Science and Technology commendation for his participation in the development and launch of Canada's first space satellite, Allouette 1. He was active in the development of extension antennae and the Canadarm produced by Spar Aerospace.

Other Vadeko members, including president G. D. Whitehead and Z. Hershtal, were also part of Spar's space design team.

### Robotic Arm

The software system designed by Vadeko for the Morton Thiokol project is similar to the system in a robotic arm built and being installed by Vadeko for Hercules Aerospace at Salt Lake City, Utah. Hercules is the builder of MacDonnell Douglas multiple launch vehicles, Titan rocket motors and Trident submarine missile motors.

Vadeko's robotic arm for Hercules is the world's largest. The 15.6-metre (50-foot) long arm weighs almost 16 tonnes (35 000 pounds) and was designed to apply specialized coatings to large-scale rocket motors such as those on the U.S. Space Shuttle. The arm components are stainless steel and capable of operating in an explosive environment.

In spite of the complexity of the project, the robot arm was designed, constructed, tested and delivered to Hercules within seven months of the contract signing. This type of performance has assisted in obtaining many new contracts for the firm.

### Proprietary Contract

Another recent proprietary contract being undertaken by Vadeko for a major U.S. firm involves automating the surface coating process for the interiors of vessels. This six-month project is expected to expand the firm's considerable expertise in surface coating technology.

The project involves the development of an automated, three-axis system — two servo controlled, one manually pre-set. Vadeko's design challenge is to develop a multi-pass, multi-service swivel to deliver the coating elements through a rotating joint.

Other less exotic uses for Vadeko's robotic arm expertise include a study for the Toronto Transit Commission to determine the feasibility of cleaning the underside of subway rail cars. Another is the automatic painting of rail car and tank car interiors by robot — a task that carries risks for human operators of spray equipment in confined quarters.







### Further Developments

Yet another Vadeko process involves high-vacuum roll coating of thin film which is built to the client's requirements and materials patented by the National Research Council (NRC). Using dielectrics, a new optical monitor is also being developed in conjunction with the NRC which will measure thickness down to one angstrom at three hertz frequency (a wavelength of light equal to one 10-billionth of a metre at a frequency of three cycles per second).

Vadeko's clients have included Ontario Hydro which commissioned the company to solve a problem of creep in the Candu nuclear reactors at Bruce Nuclear Power Units 1, 2 and 3. The macroscopic changes in tube dimensions were such that there was not enough latitude to accommodate the creep during the lifetime of the reactors. Vadeko's solution included tool development, operational procedures, system design strategies and the integration of other tooling.

### Vadeko Expands

Although less than a decade old, Vadeko has been strengthened by the purchase of 50 percent of its stock by the AGRA Industries of Saskatoon.

This industrial conglomerate also includes AGRA Consulting Engineering Group which has some 300 professional staff (engineers, scientists, geologists), 500 technical staff (draftpersons, computer programmers, technicians, laboratory staff) and 100 office support staff working in 39 offices throughout Canada and the United States.

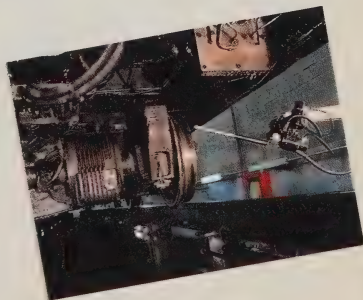
The balance of Vadeko stock has been retained by the company's founders, all members of the Vadeko team which has grown to over 75.

In addition to its offices, labs and machine shops at Mississauga, Vadeko maintains an Ottawa engineering design and development office.

Vadeko is one of a number of highly competent engineering, research and development enterprises that are developing world-class capabilities in specialized niches — firms that enhance Canada's reputation for expertise that was established by giants such as Monenco, Lavalin and SNC.

For further information, contact:  
Vadeko International, Inc.  
6535 Mill Creek Drive, Unit 62  
Mississauga, Ontario L5N 2M2  
Tel: (416) 821-3222/3  
Telex: 065-28106

Vadeko robotic arm is designed to apply coatings to rocket motors.





# A amphibico — It's a Case of Encasement

**W**hether its product is probing deep water or aiding research into deep space, a small dynamic firm in Dorval, on Montréal's western fringes, Amphibico Inc. has developed a hi-tech video camera housing that is rapidly becoming a world standard.

Although Amphibico is less than two years old, equipment designed and tested by Amphibico principals, Val Ranetkins and James Moore, is now in use by two adventurers in the Arctic; by National Geographic photographer, Peter Jennings, to probe a newly discovered meteorite crater; and by NASA for several space-related projects.

The company's latest product, the Amphibian V9-N housing, was specifically designed for the Sony CCD-V9, an 8mm video camera featuring superior image resolution and increased low-light sensitivity which make it ideal for underwater photography.

## High Arctic Adventure

In late July, Jeff MacInnis, of Ottawa, and his partner in adventure, Torontonian Mike Beedell, left for the high Arctic to try to complete a 4000-kilometre (2500-mile) sailing trip in a catamaran and into the record books that the pair started two years ago.

With them they took a Sony CCD-V9 video camera and Amphibian V9-N housing. It was a gift from Jeff's dad, who in 1983 located the wreck of the *HMS Breadalbane*, which went down in 1853 while searching for the lost Franklin expedition.

For the younger MacInnis, the Amphibian V9-N housing encasing the camera would not only protect its valuable records in the case of a mishap such as capsizing but would also allow the adventurers to take underwater films of Arctic aquatic life.

In the case of NASA, the camera with its protective Amphibian V9-N housing is used in the space agency's high-pressure water tank to record the effects of weightlessness on the human body.

## Innovative Features

The Amphibian V9-N housing has a number of innovative features, which include:



Amphibico's housing in action underwater.



- a visual recording signal which, through a flashing light, indicates to the operator and other divers that the camera is working;
- a bayonet mount lens allows the diver to preselect a wide angle or flat port lens assembly;
- an enlarged electronic viewfinder with X8 magnification;
- a highly sensitive and noise-free amphibious microphone;
- electronic zoom-control slowed down for macro focusing;
- convenient cassette and battery change without camera removal from the housing; and
- an additional port for attaching an underwater communications receiver

#### High Quality

The Amphibico unit is manufactured from high quality aluminum. It has an operating depth of 105 metres (350 feet), with precision optics corrected for use both above and below water.

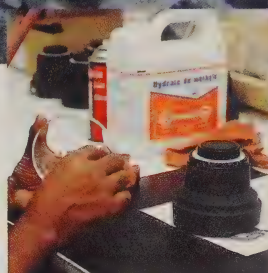
Although primarily designed for divers, it is also possible to mount the camera and its housing on a remote-controlled submersible. Other uses include damage assessment underwater where the diver follows instructions of inspectors on land or shipboard.

While concentrating largely on developing worldwide sales for its unique product, Amphibico's ambition is to develop a wide range of new underwater products to assist video photography.

For further information, please contact:

AMPHIBICO INC.  
9563 Côte de Liesse  
Dorval, Quebec  
H9P 1A3  
Tel: (514) 636-9910

**Precision machining the key to  
Amphibico's success.**



**Distortion free lenses improve  
quality.**



**Each camera housing is tested to  
meet required pressures.**



# Transtech International 87

**H**undreds of high-technology exhibitors displayed their products, services and expertise at the first-ever Transtech International Conference for Innovation and New Technologies — Transtech International 87.

Sponsored by the Centre for Industrial Innovation/Montréal, the exhibition filled the Montréal Convention Centre when it opened late last autumn.

Speakers at the conference covered a broad range of topics including the rapid transfer of technologies from university to industry; sub-contracting to provide access to high-tech markets; and the transfer of technologies both within Canada and internationally.

But it was the displays of both Canadian and international high-tech expertise that highlighted the exhibition. The show had something for everyone — a smorgasbord of offerings ranging from the gimmicky to developments on the frontier of science and technology.

## **Triumf Cyclotron**

For example, on display was the Vancouver firm, Triumf, operator of the world's largest cyclotron, a world-class facility for experiments in sub-atomic research and probing the structure of matter. Triumf was promoting co-operation in the upgrading of its cyclotron to expand the limits of knowledge and keep Canada in the forefront of sub-atomic research and application.

Triumf's successes have included the development of such new biomedical research tools as: new methods to take pictures of the living brain painlessly; therapy beams aimed at killing cancerous tumours; advanced heart diagnostic techniques; and new medical radioisotopes for diagnosis and treatment.

Triumf is a joint venture of four western universities (Alberta, Simon Fraser, Victoria and British Columbia) with assistance from the National Research Council.

Other universities are expected to take part shortly in the facility's latest development — a Kaon factory — which will roughly double Canada's investment in Triumf (about \$200 000 000).

At Transtech International 87, Triumf was looking for two things: scientific development projects and funds; and Canadian manufacturers capable of providing and/or developing specialized hardware and machinery.

## **Wide Range of Products and Opportunities**

At the other end of the scale were innovative gadgets such as a frypan attachment designed to prevent eggs from spilling on the stove when they are cracked open on the frypan's edge.

Between these two extremes, there were literally hundreds of developments and offerings from Canada, Europe and Asia. Most of the foreign entries were promoted in national displays and covered a wide range of trade goods and technology-transfer opportunities.

## **Transtech Awards**

In collaboration with various co-sponsors, Transtech presented awards to six entries in several categories of inventions and achievements in innovation.

The organizers of Transtech 87 considered that this, their first effort, has provided a good testing ground for future shows. The Centre for Industrial Innovation/Montréal, sponsor of the show, plans to continue holding the conference and exhibition on an annual basis, anticipating that it will develop into a world-class event.

Triumph's Positron Emission Tomography (PET) Scanner capable of diagraming brain in horizontal slices.





# Canada Awards

## Innovative Enterprise Brings its Rewards

**L**ocating a market niche and finding innovative ways to fill it seems to be the answer for many of the firms competing for the 1988 Canada Awards for Business Excellence. This was certainly true in the case of two winners of the 1987 Gold Award — Medionics International Inc. of Markham, Ontario, and Clay-Mill Technical Systems Inc. of Windsor, Ontario.

In each case, the founders used initiative, nerve and a keen eye for opportunities to bring their firms to their current state of excellence.

### **Medionics International Inc.**

Medionics topped a record number of entrants in the Small Business category, which was open to Canadian businesses with sales of less than \$2 million.

The firm designs and manufactures peritoneal dialysis equipment and related products which remove toxic substances from blood. This equip-

ment is used primarily for patients with kidney failure and other medical disorders.

Through an improved design which decreases the risk of infection during treatment and built-in early warning systems which detect infections that can lead to complications or death, Medionics has improved the safety of peritoneal dialysis treatment.

Other Medionics improvements include equipment which is simple and portable enough to be used at home by dialysis patients, reduced dialysis equipment operating costs and improved efficiency.

To date, Medionics has installed approximately 1000 units in hospitals around the world. About 75 percent of the firm's products are exported to the United States where they are marketed by major suppliers of dialysis solutions.

In Canada, Medionics markets its own products and trains hospital nursing staff in their operation, according to company president Mahesh Agarwal.

Management's objective since incorporation has been to be a world leader in the development, design and manufacture of dialysis equipment. And, since some of the world's best peritoneal dialysis centres and clinicians are located in Canada, the company has maintained a close working relationship with them to remain aware of their priorities, problems and medical advances.

Employing a management style that encourages creativity and innovation, Medionics has developed a number of breakthrough products.

Peritoneal dialyses machine  
cleanses blood.



Robotic automation a winner for Windsor's Clay Mill, according to President Clayton Pearce and Vice-President Keith Arner.



These include a unique clamping valve design that provides better heating of the dialysis fluids; operating modes that shorten the dialysis cycle; modified tubing to reduce infection; and simplified operation combined with a comprehensive set of safety valves which allow for home care treatment.

With new developments entering their final stage, it is expected that 1988 is the year that the true market potential of Medionics will be realized.

#### **Clay-Mill Technical Systems Inc.**

Robotics is not considered to be a field in which Canadians excel but it would be difficult to convince Clayton Pearce of that fact. As president of Clay-Mill Technical Systems Inc., he has put Windsor, Ontario, on the map for high technology as the world's only manufacturer of heavy-duty overhead gantry robots. And it uses another Windsor firm's vision sensors on its robots — these from Diffrauto, a runner-up to Clay-Mill in the Innovation category at the 1987 Canada Awards for Business Excellence.

As one of Canada's major auto manufacturing centres, Windsor also provides a market for the Clay-Mill robots. Both Chrysler and General Motors use them to mount doors, fenders and trunk lids to cars. And the robots have been exported to new plants in the U.S.

For example, Chevrolet's new Corsica and Beretta plant in Wilmington, Delaware, has 12 Clay-Mill cells which cost from \$250 000 to \$1 million each, depending on the type of controls.

According to Pearce, "It's been a long, hard row."

In the beginning, he had to design and build his own lift tables because no one made them with the capabilities required for the fast, accurate and flexible computerized robot system which he invented with three colleagues.

Building on the company's amazing growth since 1984 (when there were 17 employees and sales of \$600 000 compared to today's work force of 140 and sales of more than \$23 million), Pearce is moving Clay-Mill in new directions.

The first generation robot could pick up car doors and fasten them to the frame in a pre-fixed position. The second generation, now in production, measures the door opening using Diffrauto

vision sensors and adjusts the door for the best possible fit. And, for the future, the company's highly skilled technical staff are working on a third generation.

"The controls will be more sophisticated," says corporate development vice-president, Keith Arner. "I thought we had reached the limit two years ago, but we're still finding new and better ways to do things."

Pearce has expanded his planning staff to keep ahead of a changing world market. Plans call for moves into aerospace and defence work in North America and he sees major opportunities in Europe. While Pearce agrees European technology is good, he feels Europeans are behind in multiple application. Automatic mounting of car doors has become commonplace in North America, but it is just being examined in Europe.

"In England," says Arner, "they were flabbergasted to learn we were putting doors on cars in 34 seconds."

The company recently sold a robot to Imperial Tobacco in Montréal to palletize products and cut labour costs. Clay-Mill claims the robot also lends itself to hazardous applications and conditions.

Speed, accuracy and heavy load capacity are the big advantages of Clay-Mill's gantry. It can move a 900-kg payload a distance of one metre in one second to an accuracy of 0.005 cm. In the auto industry, no other system can match this, although Pearce admits that other firms are in the planning stages with competitive machines.

In spite of all the advantages of robotics, there is still resistance to the new technology in industry, even in the automotive field, now the most advanced of the heavy industries.

Much of this stems from industry reluctance to hire and train the more sophisticated technicians required to operate the robots.

For this reason, Clay-Mill offers a complete "turnkey" service, including engineering, design, assembly, installation and training services for the customer's staff.

#### **Indications of Excellence**

While these two firms were the gold medal winners in the Innovation and Small Business categories of the Canada Awards for Business Excellence, they are but an indication of the competence of the over 650 firms which entered the 1987 awards.

For further information on the two award-winning companies, contact:  
Medionics International Inc.  
Markham, Ontario L3R 4B5  
Tel: (416) 475-8431

Clay-Mill Technical Systems Inc.  
2855 Deziel Drive  
Windsor, Ontario N8W 5A5  
Tel: (519) 944-7902



## Small Ottawa firm develops innovative Printed Circuit Board Tester

**F**or Miguel Fombellida, the development of his patented printed circuit board (PCB) tester has been a continuing commitment for the last four years.

While his production model has been tested and found to do the designed functions in a satisfactory manner, a full order book or a joint-venture agreement is needed to bring the tester into full-scale production. With selling price running at \$35 000 for the master unit and \$5 000 to \$10 000 for each testing module, the task has switched from development to sales promotion.

The Spanish-born and -educated engineer has devoted most of his efforts to the development of his PCB tester since he left Northern Telecom to form ELMA Engineering Services Ltd. in 1981.

Miguel Fombellida, left, and Jean Bouchard are two partners in ELMA

### Government Assistance

Development has been assisted by grants from the Department of Regional Industrial Expansion under its Industrial and Regional Development Program and from the Program for Export Market Development (PEMD) of External Affairs.

To support R&D, Fombellida has allocated revenue from sales of precision equipment developed for clients such as Northern Telecom, Bell Northern Research and the National Research Council.

For example, the ELMA design team has developed a machine to assist in the crystal growth of gallium arsenide while another patented development is a method of splicing fibre optic cables.

### Three-Second Testing

In operation, ELMA's printed circuit board tester can test a complex printed circuit board in about three seconds and an efficient operator should be able to maintain a test speed of about 10 boards a minute and even greater if a mechanical arm is used for loading and unloading.

Because the master unit is complex and test modules must be designed to accommodate specific circuit board configurations, the tester is best suited to large-scale operations or where reliability is an overriding consideration to cost.

It was for this reason that ELMA requested and received PEMD assistance to attend high-technology shows in the New England states where a large high-tech manufacturing base has been established.

For more information on the PCB tester or to discuss technology transfer, joint-venture or licensing arrangements, contact:

Miguel Fombellida  
President  
ELMA Engineering Services Ltd.  
2540 Delzotto Avenue  
P.O. Box 930 R.5  
Ottawa, Ontario  
K1G 3N3  
Tel: (613) 822-7866





# Technology Transfers

## Offered

### Canada

- Powder Pump for Inductively Coupled Plasma (ICP) or Flame Spectrometers
- Chemorepellant Compound
- Ceramic Materials with Enhanced and Predictable Resistance to Fracture
- Elevator for Harvesting Delicate Agricultural Products
- Controlled Pattern Sprinkler
- Self-Cleaning Reversible Lava Rock Barbeque Grill
- Self-Cleaning Eavestrough
- Longline Fishing System
- Liquid Barrier Filter and Method of Operation
- Coin holder
- Automatic Damper for Chimney Flue

### Federal Republic of Germany

- Process for Recycling Waste Plastic
- Hexagonal Pixels for Better Visibility

### France

- Pyromechanics for Aeronautics and Space, Armament and Defence Applications

### Great Britain

- Alcohol Production Technology
- Polymer Electrolytes
- Polymeric Liquid Crystal Storage Devices
- Anthralin Compounds
- Laser Strain Rate Meter
- Automated Vision System and Operation Software
- Multiple Strain Gauge Monitor
- Identification of Cancerous Cells
- Non-Invasive Measurement of Cutaneous Blood Flow
- Improved Spermicidal Contraceptives
- Low-Cost Cervical Smear Pre-Screening System
- Asbestos Fibre Detection and Monitoring System

- High Efficiency Earmould
- Determination of Two-Dimensional Fluid Flow Around Structures
- Multiwire Dispenser

### Italy

- Water Heater Devices
- Reinforced Nylon Rotors
- Furniture

### Sweden

- Metal Roofing System

### Switzerland

- New Generation of Displacement Compressors, Pumps and Motors

### U.S.A.

- Device for Application of Herbicides

## Requested

### Canada

- Over-the-Counter Pharmaceutical Products

### Federal Republic of Germany

- Rubber-Related Technologies and Products
- Devices and Tools for Industrial and Craft Workshops
- Chemical Specialties and Additives

### Gabon

- Consumer Goods Sought

### Italy

- Aquaculture Technology

# Offered

## Canada

### Powder Pump for Inductively Coupled Plasma (ICP) or Flame Spectrometers

(Case No. 8175)

This "powder pump" is designed to introduce a particulate solid material in dry powder form for analysis in an ICP or flame spectrometer. It is claimed to offer relatively uniform, continuous and controlled delivery of the sample and permits the changing of samples without disrupting the operation of the analyzing device.

### Chemorepellant Compound (Case No. 8224)

This invention concerns a chemorepellant compound for attachment to a prosthetic surface for use in human and animal cardiovascular systems to provide a biocompatible surface with reduced thrombogenicity.

### Ceramic Materials with Enhanced and Predictable Resistance to Fracture

(Case No. 8381)

These ceramic materials, specifically partially stabilized zirconia employing Beta-alumina, can be made with a high Weibull Modulus, greater than 40 (steel has a Weibull Modulus of 50), with a probability of fracture of one sample in 1000. Reported to have a high resistance to fracture at low and high temperatures, these ceramics can be used for turbine components, cryogenic environments and applications where conductive heat transfer is not desired.

### Elevator for Harvesting Delicate Agricultural Products (Case No. 8514)

Without damaging delicate products, particularly those with irregular size or shape such as potatoes, this device will lift the products from the digging bed of a harvester to a height suitable for loading onto a vehicle. In principle, a similar device could be used to move many other types of delicate products.

*For further information on the above products, write to: F. K. Crowe, Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100. Please quote the appropriate Case No.*

### **Controlled Pattern Sprinkler**

According to the inventor, this rotating sprinkler contains a plastic disk that can be altered to control the irrigation in a range of large square or other configurations of areas to be irrigated, at differing water volumes and high pressure, concentrating the water supply into a single nozzle for even spray.

### **Self-Cleaning Reversible Lava Rock Barbecue Grill**

The barbecue grill consists of two grills with a layer of lava rock between them and has a pair of insulated handles for handling when hot. The grill requires only minor wire brushing to keep clean and is claimed to reduce flames, cook quickly and can be kept odour-free by simply reversing it a few minutes after cooking. It works well with gas, electric or charcoal barbecues.

### **Self-Cleaning Eavestrough**

The eavestrough has a snap-on filtering cover and an inclined bottom wall to form a sharp angle with a vertical suspending wall. The inventor states that this arrangement concentrates the water flow into an increasingly smaller area for rapid flow and self cleaning, and prevents ice from sticking to the inclined bottom. The system can be made from a variety of standard materials at competitive cost.

*The technology for the above three products is available through licensing or joint-venture arrangements from the inventor. Write to: Florencio N. Palma, 263 Keele Street, Toronto, Ontario M6P 2K1; Tel: (416) 763-1429.*

### **Longline Fishing System**

A Canadian company is offering, through a licensing arrangement, the exclusive manufacturing and worldwide marketing rights to the technology it has developed for an automatic longline fishing system. The offer includes consultation and the expertise needed to set up a production line. The system consists of four major components — first line hauler and hook debaiter; main hauler with automatic hook pickup; revolutionary storage magazines; and automated baiter and cutter combination.

*Write to: George or Leith Jollimore, Jollimore Longline Systems, P.O. Box 335, Kensington, Prince Edward Island C0B 1M0; Tel: (902) 836-3549 or 836-3509.*

### **Liquid Barrier Filter and Method of Operation**

The technology is offered for this invention which provides a process for removing, by a liquid barrier, pollutant particles from a contaminated gas. According to the developer, the barrier can remove such contaminants as organic and inorganic fumes, dusts (in particular, insecticides or herbicides), suspended pigments, pollen, bacteria, viruses, radioactive fallout. Laboratory tests show the system to have a 99 to 100 percent efficiency.

*Write to: Sylvain Desjardins, Bureau Liaison Université-Industrie, Université de Sherbrooke, Sherbrooke, Quebec J1K 2R1; Tel: (819) 821-7840; Telex: 05-836149.*

### **Coin holder**

A Canadian inventor wishes to enter into a licensing arrangement for the manufacturing and marketing of his one-piece plastic coin holder. The inventor claims as advantages, it is easy to fill and empty, inexpensive to produce (around two cents per unit), can be used as publicity tool (i.e., messages can be printed on it) and can be filled either manually or mechanically. Its small openings on the sides permit verification of authenticity of coins and finally, this type of coin holder is designed to eliminate the need to count the number of pieces.

### **Automatic Damper for Chimney Flue**

A Canadian inventor wishes to enter into a licensing arrangement for the manufacturing and marketing of his automatic damper for chimney flue. Among the advantages claimed by the inventor is an appreciable fuel economy. This damper can be used in all kinds of heating systems and can be applied commercially or in residences.

*For further information on the two above inventions, write to: P. A. Chabot, President, PARECOM Ltd., 736 Baker Avenue, Ville de Vanier, Quebec G1M 2T9; Tel: (418) 527-3979 (evenings).*

### **Federal Republic of Germany**

#### **Process for Recycling Waste Plastic**

A German company is offering, under a licensing arrangement, its technology for a process to recycle waste plastic material and is in a position to build turnkey plants for full-scale production. The process uses scrap plastic of all sorts. It requires only 80 percent purity of one specific plastic (e.g., PVC, PE, PPE) and the rest may be other plastic, dirt, paper, etc. The range of products varies from outdoor benches, fence posts, etc., to stands for road signs.

#### **Hexagonal Pixels for Better Visibility**

A German company is offering, under a licensing arrangement, the manufacturing and marketing rights to its technology for displays with hexagonal pixels, claimed to give a visibility three times better than with round or square pixels. All letters or figures can be presented. Applications include cash registers, dashboard displays, computer screens, destination panels for public transport, watches.

*For further information on the above, write to: Götz Schade, Innovationsberatung, Finkenstrasse 14, D-7534 Birkenfeld, Federal Republic of Germany; Tel: (0 72 31) 48 07 23; Telex: 17 7231 113.*

## France

### **Pyromechanics for Aeronautics and Space, Armament and Defence Applications**

A French company, with extensive expertise in the use of pyrotechnics in a wide range of applications, wishes to discuss the transfer of its technology with a Canadian company. Applications of its technology range from cutting steel or composite cables up to 50 mm diameter under water, explosive bolts, flexible linear cutting charges, etc., to automatic release of air bags in cars, and sprinkler actuators.

*Write to:* Götz Schaudé, Innovationsberatung, Finkenstrasse 14, D-7534 Birkenfeld, Federal Republic of Germany; Tel: (0 72 31) 48 07 23; Telex: 17 7231 113.

## Great Britain

### **Alcohol Production Technology** (Ref. VC 002)

An improved method of ethanol production from biological/agricultural feedstock has been developed. The method uses a continuous fermentation system operated at high biomass concentration and very short throughput times.

### **Polymer Electrolytes** (Ref. VC 004)

Novel polymeric materials based on modified PEO polymers have been developed, jointly with the British Ministry of Defence, which are claimed to have significantly higher ambient conductivities than conventional materials. In addition to use as battery electrolytes, the materials are said to have potential applications as elastomers and hydrophilic materials.

### **Polymeric Liquid Crystal Storage Devices**

(Ref. VC 006)

New types of polymeric liquid crystals have been developed as information storage devices. Applications include laser writing, advertising displays, audio-visual presentations, variable optical density systems, data storage, variable light transmission windows.

### **Anthralin Compounds** (Ref. VM 1015)

Improved anthralin compounds and formulatory technology have been developed for use in the treatment of the common skin complaint, psoriasis. Increased effectiveness and the reduction of undesirable side effects are claimed.

### **Laser Strain Rate Meter** (Ref. VE 110)

The measurement of resistance to the flow of a fluid by friction with the walls of the containment system is possible using a laser-based device. The device permits the determination of the resistance encountered by the fluid and thus the forces needed to transport it through the containment system.

### **Automated Vision System and Operation Software** (Ref. VE 117)

An imaging system, with operating software claimed to be unique, has been developed for a wide variety of applications. Backed by a long-established R&D operation with interests in scientific, medical and industrial imaging, the system has been supplied internationally to motor manufacturers, engineering component manufacturers and for medical/scientific use.

### **Multiple Strain Gauge Monitor** (Ref. VE 120)

A microcomputer-based system has been developed to monitor resistance changes in a multiplexed system of strain gauges. The use of a variable current source under computer control provides the same derived voltage for all gauges under no strain conditions, compensating for the spread of their nominal resistance. A very small difference between gauge voltages can be amplified before measurement in a low precision analogue-to-digital converter, providing high overall measurement precision at low cost.

### **Identification of Cancerous Cells**

(Ref. VM 1003)

A procedure has been developed using the interaction of glyco-lipid fibronectin present on the surface of tumour cells in the presence of an enzyme. This interaction yields a series of peptides specific to the tumour cells. The procedure may be used with any tissue sample or body fluid and conventional techniques for peptide assay may be used.

### **Non-Invasive Measurement of Cutaneous Blood Flow** (Ref. VM 1004)

A laser-doppler-based device is presented for the measurement of the flow of blood in the skin and sub-cutaneous tissue. The device measures the blood flow by comparison of the scattering effect measured with a reference base. The device is claimed to be useful in many clinical conditions such as Raynaud's disease.

### **Improved Spermicidal Contraceptives**

(Ref. VM 1013)

A two-component spermicidal composition, using components of known spermicidal activity, has produced what is believed to be a major synergic improvement in contraceptive activity. This may result in the possibility of significant reductions in the amounts of active components used without reduction in contraceptive activity.

### **Low-Cost Cervical Smear Pre-Screening System** (Ref. VM 1020)

A low-cost, semi-automated system for pre-screening of cervical smear tests uses proven imaging techniques, coupled with new techniques in cell dispersion and de-aggregation and fluorescent staining. The system is designed to reduce administrative work in scheduling patients in hospitals, clinics and health centres.

### **Asbestos Fibre Detection and Monitoring System** (Ref. VM 1021)

An imaging system and operating software have been developed which automate the time-consuming process of monitoring environmental and workplace dust samples for asbestos fibres. The system is reported to be in use worldwide.

### **High Efficiency Earmould** (Ref. VM 1016)

A new method of moulding ear inserts for hearing aids has been developed using a cold-cured composite which is moulded to the patient's ear in the clinic and immediately fitted to the hearing aid, using simple manipulations. This is said to reduce the discomfort of present moulding techniques. It also reduces delays in delivery which, when the patient is a child, can result in air leakage and poor acoustics because of the change and growth of the ear.



#### **Determination of Two-Dimensional Fluid Flow Around Structures** (Ref. VS 10008)

A software tool has been developed for the accurate prediction of the effect of fluid flow in two dimensions around cylindrical objects. The new system has applications for civil engineers, naval architects and others concerned with the design of structures subjected to fluid flow forces.

#### **Multiwire Dispenser** (Ref. VE 119)

A simple device holds, separates and dispenses a multiplicity of wires for multiwire cables and looms. It is said to be useful on devices with multiple sensors or connectors where storage wires and leads can be a problem. Applications are foreseen in a wide range of medical, industrial and instrumental environments.

*The above technologies are available through licensing arrangements. Write to:* Vuman Ltd., Patent and Licensing Division, Enterprise House, Manchester Science Park, Lloyd Street North, Manchester M15 4EN, England; Tel: (061) 226-8746; Telex: 265871 (attn. MMD103). *Please quote the appropriate reference number.*

#### **Italy**

##### **Water Heater Devices**

An Italian company is offering to Canadian firms the manufacturing and marketing rights to its devices used in water heaters, which are claimed to have energy-saving properties. The devices are — the CAL-10 kit which, applied to existing electric storage water heaters, gives energy savings up to 60 percent; the SCALDABAGNO electric storage heater, also providing savings up to 60 percent; CAL-10 HEAT PUMP which combines the advantages of the CAL-10 system with those of an air-to-water heat pump giving savings up to 80 percent.

*Write to:* Martin Scherer, SOLAREX S.a.s., Piazza Piccapietra 83/65, 16121 — Genova, Italy; Tel: (010) 591297.

##### **Reinforced Nylon Rotors**

An Italian firm, specializing in the design and manufacture of reinforced nylon rotors for air conditioning/purification systems, is offering to a Canadian firm the manufacturing rights to its products.

*Write to:* TEKNOR S.a.s., Piazza Belloni, 9, 33100 Udine, Italy; Tel. 0432/26264; Telex: 450480 TEKNOR I.

##### **Furniture**

An Italian firm wishes to enter into a joint-venture arrangement and/or licensing agreement for the transfer of technology in the manufacture of its upholstered furniture and furnishing accessories in wood, metal and marble.

*Write to:* GIOVANNETTI ITALIA, P.O. Box 1, Via Perucciani, 51032 Bottegone (Pistoia), Italy; Tel: 0573/544755; Telex: 572338 GICASA.

#### **Sweden**

##### **Metal Roofing System**

A Swedish firm is offering to Canadian companies, through a licensing agreement or outright sale, the manufacturing and marketing rights for its metal roofing system, the PW-Roof. The system can be applied to existing buildings or new construction and consists of rolled sheet metal panels of 600 mm or 800 mm. No end splices are necessary. Each panel is gutter-shaped so that water will flow away from the joints.

*Write to:* Mats Jalar, SPEKON AB, Innergatan 17, 942 00 Älvsbyn, Sweden; Tel: 46-929-12544.

#### **Switzerland**

##### **New Generation of Displacement Compressors, Pumps and Motors**

Swiss engineers are offering to Canadian companies, through a licensing agreement, the manufacturing and marketing rights to their recently designed range of pneumatic and hydraulic aggregates where the displacement bodies rotate in eccentric orbits. They can be applied to pumps for liquids, compressors for gases, and motors and meters for both liquids and gases.

*Write to:* Götz Schaudé, Innovationsberatung, Finkenstrasse 14, D-7534 Birkenfeld, Federal Republic of Germany; Tel: (0 72 31) 48 07 23; Telex: 17 7231 113.

#### **U.S.A.**

##### **Device for Application of Herbicides**

An American company is offering to Canadian manufacturers the manufacturing and marketing rights, through licensing or joint-venture arrangements, of its device for applying herbicides. It is claimed that the device will kill unwanted vegetation, particularly in the post-emergence stages of crop growth. The manufacturer believes that the device will lessen the amount of chemical required during post-emergence treatment; will generally eliminate the second application; and is highly cost effective.

*Write to:* The President, Transtech Services USA, P.O. Box 21003, Alexandria, Virginia, VA 22320-2003, U.S.A.; Tel: (703) 548-8543.

# Requested

## Canada

### Over-the-Counter Pharmaceutical Products

A Canadian company wishes to acquire, through a licensing arrangement, the manufacturing and marketing rights to new over-the-counter pharmaceutical products.

*Write to:* Mario Thomas, New Products Director, Burroughs Welcome Inc., 16751 Trans-Canada Highway, Kirkland, Quebec; Tel: (514) 694-8220; Telex: 05-821860.

## Federal Republic of Germany

### Rubber-Related Technologies and Products

(Case No. B709)

A West German company wishes to acquire, through licensing or joint-venture arrangements, new rubber formulas for special applications; thermoplastic rubber; moulded parts made from rubber, rubber-metal and rubber-plastic; new products for recapping tires; new processes for recycling rubber and/or plastic and products made from them.

### Devices and Tools for Industrial and Craft Workshops

(Case No. B710)

A group of West German companies is searching for new devices and tools for industrial and craft workshops, e.g., chucks for cutting, grinding, drilling, welding, etc.; clamping devices for Computerized Numerical Control (CNC) machine tools and robots; tools for cutting sheet metal. Licensing or joint-venture arrangements are sought.

### Chemical Specialties and Additives

(Case No. 8306)

A West German firm wishes to acquire, through a licensing arrangement, chemical specialties and additives. Products sought include: antifoam and flocculating agents for food, sugar, yeast, alcohol, starch, pharmaceutical and paper processing; additives for the rubber industry and for sealants; specialty chemicals for water treatment.

*For further information on the above requests, write to:* Götz Schaudé, Innovationsberatung, Finkenstrasse 14, D-7534 Birkenfeld, Federal Republic of Germany; Tel: (0 72 31) 48 07 23; Telex: 17 7231 113.

## Gabon

### Consumer Goods Sought

A company from Gabon wishes to enter into a joint-venture agreement or any other type of business arrangement for the acquisition of Canadian consumer goods (cosmetics, hygiene, food, etc.) for manufacturing and/or marketing in Gabon.

*Write to either:* I.E. Efford, Honorary Consul for the Republic of Gabon, 1909 Broadmoor Avenue, Ottawa, Ontario K1H 5B3; Tel: (613) 526-4427, Telex: 053-4741; *or to:* A. Moussadji, COGADIEY, Libreville, B.P. 215 and 4136, Gabon; Tel: 76.43.67, Telex: 5489 GO.

## Italy

### Acquaculture Technology

An Italian company is seeking, through a joint-venture arrangement, the technology related to the intensive farming of frogs and tadpoles.

*Write to:* CONSORZIO LATINA EXPORT, Via Umberto I, 84, 04100 Latina, Italy; Tel: 0773/493365; Telex: 680457 CCIALT I, att. LT/EXP.

# Special Events

## Summary

### Canada

- Fisheries Council of Canada 1988 Annual Convention  
Québec City — October 1988
- International Interior Design Exposition (IHDEX)  
Toronto — November 1988
- New Uses for Milk  
Québec City — November 1988

### Bahrain

- MECOM 89  
Bahrain — January 1989

### Denmark

- 6th International Trade Fair for Machine Tools and Tools  
Copenhagen — October 1988
- 4th International Trade Fair for Road Transport, Internal Materials Handling and Storage Systems  
Copenhagen — October 1988
- 3rd International Fair for Industrial Robots and Robot Technology  
Copenhagen — October 1988

### France

- SIAL '88  
Paris — October 1988

### Federal Republic of Germany

- ELECTRONICA 88  
Munich — November 1988
- BAUMA 89  
Munich — April 1989

### Finland

- 1989 International Mechanical Pulping Conference
- PULPAPER '89  
Helsinki — June 6-8, 1989

### Great Britain

- TECHMART  
Birmingham, England — November 1988

## U.S.A.

- Instrument Society of America  
Houston — October 1988
- WESCON  
Anaheim — November 1988
- WORLD TECH 89  
New York City — June 1989

## U.S.S.R.

- SKIAD '88  
Moscow — October 1988

## Canada

### • Fisheries Council of Canada 1988 Annual Convention

Auberge de Gouverneurs, Place Hauteville  
Québec City, Quebec  
October 4-6, 1988

*Write to:* Fisheries Council of Canada,  
505-77 Metcalfe Street, Ottawa, Ontario  
K1P 5L6; Tel: (613) 238-7751.

### • International Interior Design Exposition (IIDEX)

Metro Toronto Convention Centre  
Toronto, Ontario

November 4-6, 1988

*Write to:* Reva Karstadt, Executive Director,  
Association of Registered Interior Designers of  
Ontario, 168 Bedford Road, Toronto, Ontario  
M5R 2K9; Tel: (416) 921-2127.

### • New Uses for Milk

Hôtel Loews le Concorde, Québec City,  
Quebec

November 16-18, 1988

*Write to:* Bureau de l'extension, Pavillon Paul-  
Comtois, Université Laval, Québec, Quebec  
G1K 7P4; Tel: (418) 656-5693. Organized by  
Le Groupe Stela, Tel: (418) 656-3951.

## Bahrain

### MECOM 89

#### 6th Middle East Electronic Communications Show and Conference, and 6th Middle East Computer Show

Bahrain

January 23-24, 1989

*Write to:* Unilink, 5 Donalda Crescent, Agincourt,  
Ontario M1S 1N5; Tel: (416) 291-6359; Telex:  
06-968027; Fax: (416) 291-0025.

*Further details contact:* Mecom 89, c/o Depart-  
ment of External Affairs, Middle East Division,  
Mrs. Terry Brophy, (613) 990-5984.

## Denmark

### 6th International Trade Fair for Machine Tools and Tools

Bella Center  
Copenhagen

October 18-21, 1988

*Write to:* Bella Center A/S, Center Boulevard,  
DK-2300 Copenhagen S, Denmark; Tel: (01) 51 88 11;  
Telex: 31 188 dk.

### 4th International Trade Fair for Road Transport, Internal Materials Handling and Storage Systems

Bella Center  
Copenhagen

October 18-21, 1988

*Write to:* Bella Center A/S, Center Boulevard,  
DK-2300 Copenhagen S, Denmark; Tel: (01) 51 88 11;  
Telex: 31 188 dk.

### 3rd International Fair for Industrial Robots and Robot Technology

Bella Center  
Copenhagen

October 18-21, 1988

*Write to:* Bella Center A/S, Center Boulevard,  
DK-2300 Copenhagen S, Denmark; Tel: (01) 51 88 11;  
Telex: 31 188 dk.

## France

### SIAL '88

#### International Food Fair

Paris

October 17-21, 1988

*Write to:* NOWEA International GmbH, Postfach  
32 02 03, Stockumer Kirchstrasse 61, Halle 11,  
Messegelaende, D-4000 Düsseldorf 30, Federal  
Republic of Germany; Tel: (211) 45 60-02;  
Telex: 8 588 351 now d.

## Federal Republic of Germany

### ELECTRONICA 88

#### 13th International Trade Fair for Components and Assemblies in Electronics

Munich

November 8-12, 1988

*Write to:* Münchener Messe- und Ausstellungsge-  
sellschaft mbH (MMG), Messengelände, Postfach  
12 10 09, D-8000 München 12, Federal Republic  
of Germany; Tel: (89) 51 07-0; Telex: 5 212 086  
ameg d.

### Bauma 89

#### 22nd International Trade Fair and World Forum for Construction Equipment and Building Material Machines

Munich

April 10-16, 1989

*Write to:* Unilink, 5 Donalda Crescent, Agincourt,  
Ontario M1S 1N5; Tel: (416) 291-6359; Telex:  
06-96 80 27; Fax: (416) 291-0025.



## **Finland**

### **1989 International Mechanical Pulping Conference, and PULPAPER '89, Trade Fair for the Pulp and Paper Industry**

Helsinki Exhibition and Congress Center, Helsinki, Finland

June 6-8, 1989

*Write to:* Erik Kihlman, The Finnish Paper Engineers' Association, Pietarinkatu 1 C, SF-00140 Helsinki, Finland.

To present a paper, submit an abstract of 500 words in English no later than October 14, 1988, to Jan Sundholm, Technical Secretary, The Finnish Pulp and Paper Research Institute, P.O. Box 136, SF-00101 Helsinki, Finland.

## **Great Britain**

### **TECHMART Technology Transfer Exhibition**

National Exhibition Centre, Birmingham, England

November 15-17, 1988

*Write to:* Carole Jackson, Focus Events Limited, Greencoat House, Francis Street, London, England, SW1P 1BR; Tel: 01-834-1717; Fax: 01-828-0270; Telex: 941-9564.

## **U.S.A.**

### **Instrument Society of America**

Houston, Texas

October 16-20, 1988

*Write to:* Instrument Society of America, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, North Carolina, NC 27709, U.S.A.; Tel: (919) 549-8411.

### **Wescon**

Anaheim, California

November 15-18, 1988

*Write to:* Electronic Conventions Management, 8110 Airport Boulevard, Los Angeles, California, CA 90045, U.S.A.; Tel: (213) 772-2965.

## **WORLD TECH 89**

### **International Exposition and Conference for Commercial, Industrial and Scientific Advanced Technology**

Jacob K. Javits Convention Center, New York City

June 28-30, 1989

*Write to:* A. Robert Terrero, Account Executive, American European Trade & Exhibition Center Corp. (AETEC), 225 West 34th Street, Suite 906, New York, NY 10122, U.S.A.; Tel: (212) 563-5350; Telex: 697342 euroamf; Fax: (212) 736-0027.

## **U.S.S.R.**

### **SKLAD '88**

### **International Exhibition of Stock Handling, Warehouse Technology, Automation and Mechanization**

Moscow, Krasnaya Presnya

October 19-26, 1988

*Write to:* NOWEA International GmbH, Postfach 32 02 03, Stockumer Kirchstrasse 61, Halle 11, Messegelaende, D-4000 Düsseldorf 30, Federal Republic of Germany; Tel: (211) 45 60-02; Telex: 8 588 351 now d.

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**Goose Bay, Labrador**  
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Suite 400  
134 Kent Street  
P.O. Box 1115  
Charlottetown  
Prince Edward Island  
C1A 7M8  
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1496 Lower Water Street  
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Halifax, Nova Scotia  
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330 Portage Avenue  
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P.O. Box 981  
Winnipeg, Manitoba  
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Tel: (204) 778-4486

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Tel: (604) 388-3181  
**Prince George**  
Tel: (604) 561-5158

## YUKON

108 Lambert Street  
Suite 301  
Whitehorse, Yukon  
Y1A 1Z2  
Tel: (403) 668-4655

## NORTHWEST TERRITORIES

Precambrian Building  
P.O. Bag 6100  
Yellowknife  
Northwest Territories  
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# INNOVATION

Spring 1989

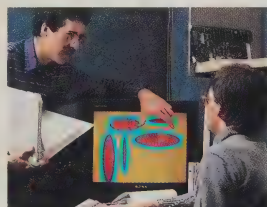


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Halifax-based institute helps companies across Canada through marketing assistance, risk assessment, product development assistance and planning, contract research and development, etc.



### 7 Inno-Centre Québec - Business Mentoring

Non-profit Québec start-up centre provides essential support and specialized assistance — mentoring — to Canadian companies.

### 10 Glacem Inc. - Luge Tracks in a High-Tech Age

St-Lambert, Quebec, company has developed a system of maintaining temperatures in ice and snow slides (particularly luge runs) to prolong their use.



### 12 Innovation and Invention - Factors in Success

Canada Awards for Business Excellence honours Canadian companies for their Innovation and Inventiveness.



### 14 Canadian Plastic Institute: Plastics - Canada's Fastest Growing Industry

Canadian Plastics Institute helps industry discover and exploit innovative technology for plastics.

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A Scarborough, Ontario, company has developed a method of monitoring the levels of harmful radiation from the decay products of the radioactive gas radon.

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## INNOVATION

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

INNOVATION, Technology Transfer Service (JOII), Technology Liaison Directorate, Industry, Science and Technology Canada, 235 Queen Street, Ottawa, Ontario K1A 0H5  
Tel: (613) 954-3458.

(Également publié en français)

Hon. Harvie Andre  
Minister, Industry, Science and Technology Canada

Hon. William C. Winegard  
Minister of State (Science and Technology)

Hon. Tom Hockin  
Minister of State (Small Businesses and Tourism)





**I**nnovation is not, repeat not, dead! It is very much alive and with prospects of becoming even better. Of course, we speak not just of this magazine (which has had its problems) but of the innovative, entrepreneurial spirit that exists in this country.

This issue of *Innovation* magazine reflects that spirit in the articles and information we have included. And we intend that future issues will continue in that regard and, in addition, present the aims, programs and services to Canada's business and industrial communities of our new department, Industry, Science and Technology Canada.

### Ongoing Involvement

The department's ongoing involvement is shown in the presentation of some of its programs — TECHNOLOGY OUTREACH PROGRAM (TOP), TECHNOLOGY OUTREACH PROGRAM/ADVANCED INDUSTRIAL MATERIALS (TOP/AIM), SECTOR COMPETITIVENESS INITIATIVES and STRATEGIC TECHNOLOGIES PROGRAM. All have been designed to assist in furthering high technology in Canada.

Articles on the Canadian Plastics Institute, Inno-Centre Québec and the Halifax-based Applied Microelectronics Institute describe how federal and provincial governments as well as private institutions have and continue to encourage and help Canadian industries across the country.

### The Innovative Spirit

Two examples of the innovative spirit can be seen in the articles on Glacem Inc., of St-Lambert, Quebec, and R.A.D. Service and Instruments Ltd. of Scarborough, Ontario.

Only about two years old, Glacem Inc. has already revolutionized the sport of sliding on ice and snow — tobogganing and luge. It has developed a method of keeping the ice on sliding tracks, such as luge runs, frozen to the best state for fun even when temperatures rise to near melting point.

R.A.D. Service and Instruments Ltd., long a leader in the development and production of radiation monitoring devices, has developed a method of monitoring the harmful radiation decay products of the radioactive gas radon. In many countries, these decay products, called "radon daughters", constitute a major part of the natural radiation dose to human beings.

Further examples of these innovative and inventive spirits are reflected in the article on the winners of the 1988 Canada Awards for Business Excellence in the *Innovation* and *Invention* categories — Alcan International Limited and Virtual Prototypes Inc., both of Montréal.

Alcan won the Gold Award in the *Invention* category for developing a safe, compact and highly efficient source of standby electric power. Virtual Prototypes' Gold Award for *Innovation* was for designing an easily used software for complex computer control and display systems such as used in aircraft cockpits, car dashboards and monitoring workstations.

Our regular features will continue to describe opportunities in the transfer of technology as well as special events of note around the world.

So innovation lives in Canada and we believe it will prosper as long as Canadians continue to have the will and enterprise not only to dream but to bring their dreams to reality.



# NEW DEPARTMENT (ISTC) – NEW PROGRAMS

Industry, Science and Technology Canada (formerly the Department of Regional Industrial Expansion) provides a number of programs that reflect its new mandate. Among the newest are the Technology Outreach Program (TOP), its offshoot the Technology Outreach Program/Advanced Industrial Materials (TOP/AIM), the Sector Competitiveness Initiatives and the Strategic Technologies Program.

## Technology Outreach Program (TOP)

The primary aim of TOP is to improve the productivity and competitiveness of Canadian industry by providing financial support for the acquisition, development and diffusion of technology and training, especially to small and medium-sized businesses.

This will be achieved by granting start-up and, in some cases, sustaining assistance to non-profit organizations established to provide technology development and diffusion as well as training to support industry in Canada. Included are industry associations, provincial research organizations, technology centres affiliated with universities and other educational institutions.

Under TOP, start-up assistance can be provided up to 50 percent of the forecast operating costs, averaged over a five-year start-up period. Assistance can be up to 100 percent of the operating costs in the first years but will decrease as revenues from other sources increase.

Sustaining assistance may be provided after the start-up period to provide services that are not completely cost-recoverable, such as technology awareness, training, visits to small businesses, international liaison. Centres will have to demonstrate that such activities are of direct benefit to their clientele.

Over all, centres will be expected to support at least 50 percent of the costs of their services through eligible contract and contribution revenues earned from domestic, non-government clients.

## Technology Outreach Program/Advanced Industrial Materials (TOP/AIM)

Extensive consultations on advanced industrial materials (AIM) have established that Canada's efforts in the field were fragmented.

The consultations were carried out between the federal government and makers and users of AIM, industry associations, universities and key public and private industry researchers. All were concerned with the lack of technological and market intelligence and inadequate communications between sectors and regions.

TOP/AIM has been created to support private industry initiatives to address these problems through support for national networks to facilitate co-operative activities among scientists, engineers and industrials in advanced industrial materials.

The networks will undertake a variety of co-operative activities in advanced industrial materials technologies and their applications. Among other activities, they will exchange information; perform joint R&D planning; foster collaboration through the brokerage of alliances; facilitate information exchanges; and carry out studies of markets and technologies.

ISTC financial support in the form of non-repayable contributions up to 50 percent of eligible costs is available for discrete networking activities leading to the formation of such national networks in existing or emerging areas of need. Support may also be available for initial studies to determine the feasibility and appropriate organizational requirements of new networks and services.

### **Sector Competitiveness Initiatives**

Sector Competitive Initiatives are aimed at increasing the international competitiveness of Canadian industry.

Where analysis and consultations with particular industries indicate that focused initiatives would be effective in improving competitiveness, action plans for co-ordinated implementation will be developed by ISTC in concert with the industry concerned and other interested departments and agencies.

These plans could include such elements as special in-depth analyses and diagnostic studies, export or investment promotion activities, and promotion of technology enhancement or transfer.

### **Strategic Technologies Program**

The Strategic Technologies Program ranges across a number of traditional and high-technology industries, including such new fields as information technologies, biotechnology and advanced materials which are essential for Canada's competitiveness and future prosperity.

In co-operation with the private sector and universities, the federal government will provide support to help industry develop, acquire or apply these technologies. In particular, firms will be encouraged to make alliances and create networks to share the costs and risks of accelerating the development and application of the technologies.

For further information, please contact:

### **Technology Outreach Program:**

Technology Liaison Directorate (JPCI)

Tel: (613) 954-3468 or 954-3466

### **Technology Outreach Program/Advanced**

### **Industrial Materials:**

Advanced Industrial Materials

Resource Processing Industries Branch (IRPI)

Tel: (613) 954-3114

### **Sector Competitive Initiatives**

Planning, Co-ordination and

Control Branch (JCPI)

Tel: (613) 954-2897

### **Strategic Technologies Program**

*Biotechnology and advanced industrial*

*materials:*

Resource Processing Industries Branch (IRPI)

Tel: (613) 954-3080

*Information technologies:*

Information Technologies Industry Branch

(IITI)

Tel: (613) 954-0599

Industry, Science and Technology Canada

235 Queen Street

Ottawa, Ontario

K1A 0H5





John Campbell (left) and Glen Loomer study an AMI-developed coloured elliptical graph on a monitor.

## Applied Microelectronics Institute It Can Be Done Here

**W**ho would have believed it? Nova Scotia businesses beating American giants on their own turf. . . and in the high-tech field. . . a business that does not show you the door when you come to its president with an idea that deserves further study. . . better still, a business that ENCOURAGES people to do this?

Have we all entered the Age of Utopia, which can only mean the end of the Age of Reason?

But the Age of Reason is flourishing, and with it, the spirit of entrepreneurship. The work done by the Halifax-based Applied Microelectronics Institute (AMI) and its assistance to firms throughout Canada is ample proof of this.

Lavalin's McLaren Plansearch Division, using research carried out by AMI, won a design contest for the new STAR 4 weather satellite receiver graphic processor for the Atlanta-based Weather Channel. Research proposals had been submitted by a half-dozen American firms, including the originator of the old STAR 3 satellite receiver. AMI's design won on the basis of quality and price.

When the manufacturing was put out to tender, the contract was won by an Amherst, Nova Scotia, firm which gives full credit for the design's success to AMI and its president, Dr. Doug Pincock. Again, one of the competitors was the American firm that had created STAR 3, and the Canadian proposal won because of its higher quality and lower price.

The current project includes a real-time graphics generator being developed for the new television weather channel. This generator will produce outstanding images, which will enable the weather channel to make its programming all the more interesting, and for a longer time, since STAR 4 will remain on the leading edge of technology until digital television becomes a reality.



In a lighter vein, AMI has just produced a prototype for an ordinary horse-racing fan who walked in off the street with an idea for calculating odds. The calculator-like prototype advises bettors on how much to wager. The product is being marketed throughout North America and Asia, after a manufacturer was found (with AMI assistance).

This clearly reflects the institute's avowed policy of encouraging people to design new advanced technology applications. AMI Marketing Vice-President Murray Vandewater will discuss any good idea with anyone.

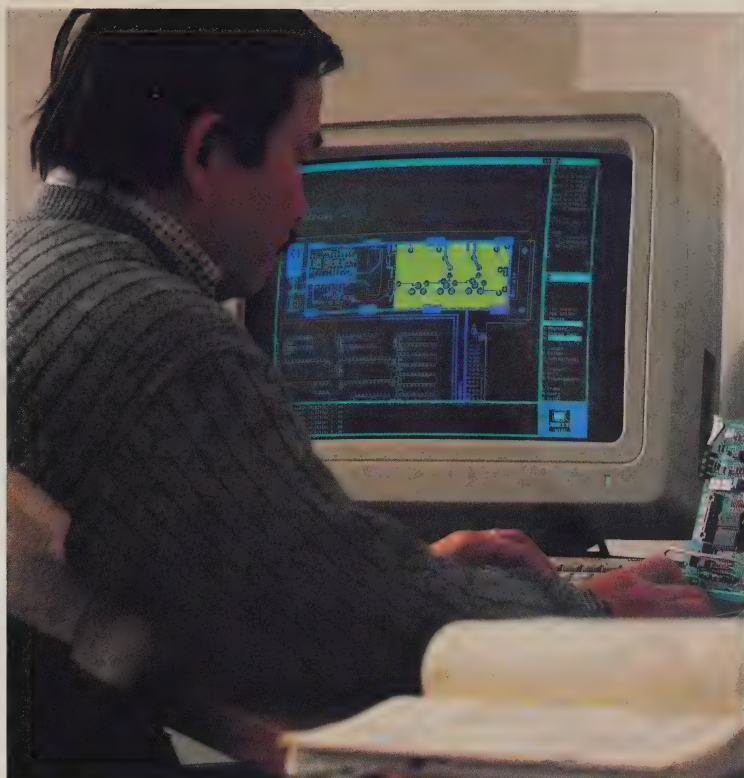
Microelectronics includes small electronic components, integrated circuits and microprocessors. Until recently, only large companies, based in major centres, could afford to create these components for their own products. They were a very, very limited elite group.

However, since AMI's founding in 1981, many businesses throughout Canada have used the services offered by this independent private company, which specializes in the design, creation, development, testing and production of microelectronic components and systems of all types. Last year alone, 20 businesses were able to explore the potential of advanced electronics in this way.

AMI grew out of the Technical University of Nova Scotia and received support in its early days from the Nova Scotia Research Foundation Corporation Ltd. and Dalhousie University. From these early beginnings, it has not only developed into a valuable company in its own right, it has also become an engine of growth for other high-tech companies. It is a living proof that a university base can be used to generate growth outside the Ontario-Quebec region.

AMI has done several million dollars' worth of business and this figure has increased every year since the company's inception. As Dr. Pincock points out, "Electronics is a fundamental part of business right now."

AMI also provides marketing assistance, risk assessment, product development assistance and planning, as well as computer-aided design (CAD) of circuit boards, software development, signal processing, simulation and non-destructive testing for companies wishing to use this technology. AMI's prime product is contract research and development for industrial clients and it also collaborates in research and teaching with local universities.



AMI is now in the process of implementing Nova Scotia's first commercial design service for application specific integrated circuits (ASICs). These tiny silicon chips, which are the equivalent of circuit boards with thousands of components, are made in only a few places in the world but can be designed locally, using special CAD facilities developed by AMI.

Another AMI specialty is the complex CAD design of printed circuits. AMI has gradually introduced computer-aided electronics engineering and simulation throughout the province. It has helped local companies develop hardware and advanced software ranging from a microprocessor control for an automated underwater camera to a microelectronic remote instrumentation diagnostic system, thus killing two birds with one stone by demonstrating that it can be done here.

The company is a leader in the design and application of electronic technologies and now, having concentrated its initial efforts on research and development, it is "looking at the . . . commercialization of everything" it does.

At the outset, AMI was subsidized by the then Department of Regional Economic Expansion programs, but now less than 15 percent of its funding comes through government sources, which is average for high-tech companies.

AMI-developed printed circuit board CAD layout being processed on a monitor by Nhan Le.



Another AMI project is an electric parking meter displayed by Andrew Reid (left) and Don Church.

For example, the STAR 4 project did not receive any subsidy or preferential government loans, and the costs were established before the free-trade issue raised public concern; there was no reliance on tariff barriers to achieve profits. Lavalin is rubbing its hands in glee over the amount to be saved thanks to freer trade.

AMI has been successful because of its ability to provide clients with a complete range of services: design (specialized CAD or software development tools for signal processing); prototype development (microprocessors, sensors, signal processing systems); mass manufacturing; and product testing.

Its projects have included the development of technology for monitoring the behaviour of aquatic animals; the development of sensors and monitoring devices for use during heart surgery; systolic/wavefront architecture for signal processing with the long-term aim of a standard chip set to support digital signal processing techniques in Very Large Scale Integration (VLSI); improved design automation aids at the symbolic layout level and investigation of algorithms for the generation of symbolic layout from a net-list style circuit description; and a data compression technique based on the estimation of conditional input probabilities.

Dr. Pincock sees maintaining a viable organization that is both stable and significant as a major challenge in an industry where technical renewal is necessary every two or three years.

Dr. Pincock and Mr. Vandewater are particularly proud of AMI's staff. From the outset, the emphasis has been on the building of skills and a high level of technical expertise. The 30-member technical staff now consists of an Engineering group to ensure the integrity of the design and production processes, and a complementary Software Engineering group.

These people represent the most impressive collection of knowledge and qualifications in Canada. Their expertise sets AMI apart from other players on Canada's microelectronics scene, in areas including multiple microprocessor applications, ASICs, system integration, multi-task software, analog/digital signal processing, telemetry, radar, voice compression, data communications networks and electronic engineering design tools.

In the administrative field, AMI helps its clients design business proposals and manage their technical activities. The company is also able to help promote products and stimulate sales, if assistance is required.

AMI has an impressive range of available equipment, and clients can reserve time and space in ultra-modern laboratories, in addition to using the well-stocked technical library.

AMI is now tackling the international market, where there is a great demand for its products. As Mr. Vandewater says, "When you look at the scale of technological development you have to look at world standards." By concentrating on the world market, AMI hopes to make world-class capabilities available in its home province.

Although Mr. Vandewater is concerned that "Nova Scotia companies won't take up the challenge of technology", AMI is ready and willing to respond to any innovative, challenging ideas.

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## Inno-Centre Québec

### Business Mentoring: An Innovation That's Paying Off

**N**ew businesses are often doomed to failure. Very few remain afloat after the first three to five years of operation. Is the business world strictly "sink or swim"? Inno-Centre Québec thinks not. This start-up centre for innovative new firms provides essential support to those who would not have been able to keep their heads above water without some help.

"Business failures are usually due to a lack of information," explains Serge Bragdon, the volunteer chairman of Inno-Centre's board of directors. "New entrepreneurs refrain from getting expert advice in order to try and save money. But that kind of decision can be very costly. At Inno-Centre, we offer a handful of companies the specialized assistance which most of them wouldn't have sought otherwise."

Located in Boucherville and coming soon to Montréal, Inno-Centre Québec is a non-profit organization which encourages new entrepreneurs to go into business.

Over the past two years, the Centre has helped launch six new outfits: three in Boucherville, housed in the Centre's building, and three other North Shore concerns that preferred to remain on their original premises, which are better adapted to their operations.

These six firms are not all in high-tech fields. "Their common denominator is their competitiveness," reveals the Executive Director of the Centre, Claude Martel. "We're interested in enterprises which are either developing new types of components, processes which are difficult to imitate, or products which have an assured market."

Unlike conventional business "incubators", Inno-Centre is not involved in product research and development. Its role commences after that stage. "We're not the type of centre which, as the term «incubator» would suggest, «gives birth to» new products and the resulting companies," Serge Bragdon explains. "Entrepreneurs come to us with a technical project which is ready to be marketed. We're more of a business consultant than a technological incubator." A businessman himself, Mr. Bragdon is now vice-president and general manager of Catelli.

#### **A Key Component of Economic Renewal**

The concept of "incubating" new businesses originated during the recession which hit western economies in the early 1970s. At that time, oil shortages were ravaging organizations which were unprepared for such a predicament.

European countries and the United States searched for viable solutions to curtail the recession. Schumacher wrote his book entitled *Small is Beautiful*. Other people founded communes and co-operatives.

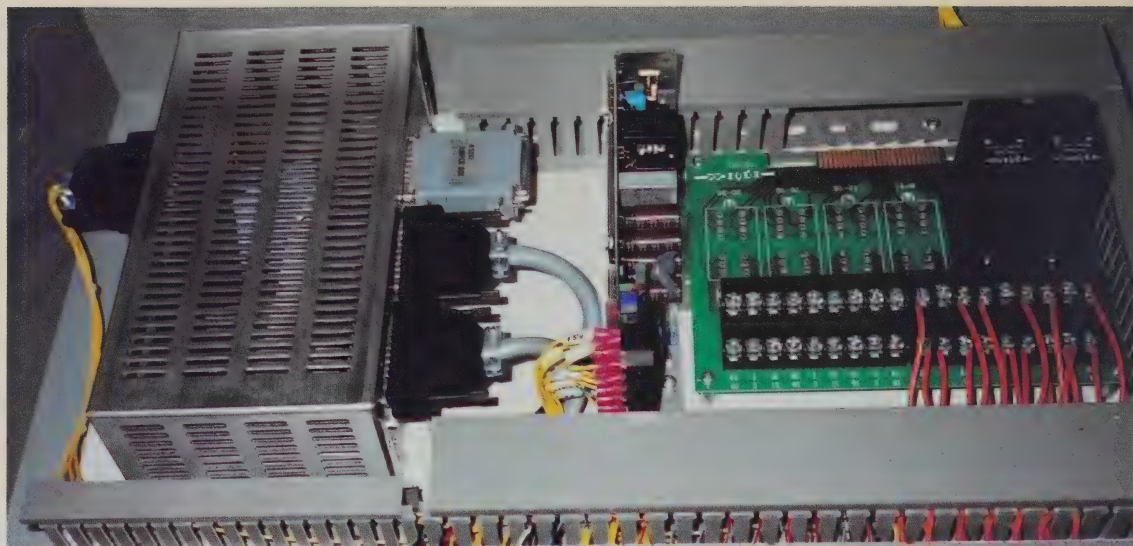
The incubator arose from this need for mutual assistance and economic renewal. Today, there are several hundred incubators in the United States, and Canada boasts 50.

"We believe in the creativity of entrepreneurs. At Inno-Centre, they find a multidisciplinary team from the research and business world to guide them and help them along the way while they start up their new venture, for a period of one, two, or even three years if necessary," continues Bragdon.

The Centre offers many valuable resources, including various services provided at cost. These include office space and equipment, secretarial help, a business plan, a network of contacts, and a management committee which plays a strictly consultative role.

"The most valuable thing we give them is credibility. Our support, and that of the Inno-Centre network of experts, opens doors for them. Once they have that essential foundation, it's up to them to prove themselves," Chairman of the Board Bragdon explains.





**Inner works of the control console for Autolog's prepositioning equipment.**

**Serge Bragdon, Inno-Centre Québec's chairman of the Board of Directors.**



### **Taking the Plunge**

With the help of Inno-Centre, several endeavours started to make headway in just a few months. Monitrol is a good example. This small business was started 18 months ago by three young engineering graduates, one from École Polytechnique and two from Université de Sherbrooke. Their product — a system which monitors atmospheric conditions in greenhouses and food warehouses. They came to Inno-Centre for help. "We needed all kinds of advice," confides Nizar Barrou, the partner responsible for sales. "Our product had already been invented, but everything else remained to be done."

The business development process demands a broad range of skills and expertise. Inno-Centre starts by carefully analyzing the needs of the new firm, and formulating a business plan. Then, the director of Inno-Centre, Claude Martel, forms a management committee to oversee the new member firm. The four or five members of the committee become "mentors" for the new enterprise, and provide direction — without interference.

One of the key experts is Michel Prieur, a highly regarded agronomist. Over the coming months, this specialist will help the young entrepreneurs adapt their product to the specific needs of future customers. Little by little, a new product for small and medium-sized greenhouses will take shape: a mini-computer which monitors over 16 parameters in the soil and air, such as CO<sub>2</sub>, pH, salinity, humidity, and the speed and direction of the wind.

Until now, this kind of equipment was made only for large greenhouses, and required an outlay of \$90 000. Monitrol is selling its system for \$8000. Finally, this type of system will be well within the reach of smaller purchasers.

André Nadeau is one of three computer scientists who, barely into their twenties, founded Autolog. "We were the very first to join Inno-Centre, which was itself just starting up at the time. Everyone was taking a risk. But it sure has paid off!" affirms Nadeau.

This venture, which manufactures automated equipment and control systems for the forestry industry, plans to achieve a million dollars in sales in just two years. Within the next few months, it will be commencing the actual production stage.

"By pointing us in the right direction, Inno-Centre has helped us save time and money. It cost us \$50 000 to set up the company, but it would have cost three times as much if we had to pay for all the services and advice we received. Our fixed costs were low, but even more important, they remained stable," says the young entrepreneur.

Beyond purely monetary concerns, quality service is also of prime importance. André Nadeau explains that the network of specialists created by Inno-Centre is second to none. "These days, it's hard to find a good business lawyer or a good accountant. Their fees are often too high. We've been given the opportunity to deal with experts who take the time to explain all the problems we'd be facing."

At the offices of Inno-Centre, the atmosphere is highly charged, yet there is also a real feeling of camaraderie. Since everyone is part of the learning process, information circulates freely; the entrepreneurs discuss every minor event between them, and then always consult with their mentors.

### **The Concept of Mentoring**

Inno-Centre is not a para-public body with an unlimited budget. Just like the businesses it nurtures, this non-profit organization must find its own sources of financing. Until now, the City of Montréal, the Ministère de l'Industrie et du commerce du Québec, Employment and Immigration Canada, and the former Department of Regional Economic Expansion (now Industry, Science and Technology Canada) have enabled it to pursue its projects.

Consulting firms are not generally renowned for being philanthropic, but they provide the essential expertise behind Inno-Centre. For instance, the law firm Bernard, Simoné, Pourpart, Despatis, Cormier, Proulx, the accounting firm Samson, Bélair, and the patent agents Swabey, Mitchell, Houle, Marcoux & Associates help new undertakings in the start-up phase. They offer a certain number of consulting hours, and provide financial aid as well.

Various educational and research institutions are also making a contribution. The École des Hautes Études Commerciales holds special courses and seminars for Inno-Centre firms. Specialized expertise and laboratories are provided by the Centre de développement technologique de l'École polytechnique, the Centre d'innovation industrielle de Montréal, the Centre de recherche industrielle du Québec (CRIQ), the Industrial Materials Research Institute — which is part of the National Research Council (NRC), and the Institut de recherche en électricité du Québec.

Autolog's André Nadeau stresses the importance of this scientific support. "The Industrial Materials Research Institute has really helped us to perfect our product. We used their labs to do some testing, and their technologists analyzed the results. And the Centre de recherche industrielle du Québec has given us access to its data bank to do research on components and manufacturing processes; they've really been a big help."

The mentors, or the companies' management committee, may change over the two-year start-up period, depending on the type of input needed at each stage of the development process.

Autolog, which is commencing the manufacturing phase, needs production-related advice at this point in time. As it is actively preparing to expand into western Canada, where 70 percent of the country's sawmills are located, it must negotiate agreements with parties who will represent its interests in the West. Inno-Centre is there to provide the appropriate orientation.

## Business Mentoring: A Growing Trend

Inno-Centre is part of a growing trend toward business mentoring. In 1987, the Corporation de développement économique de Boucherville launched the Centre in collaboration with the city's mayor, Jean-Guy Parent. Initially, the goal was to foster development on a provincial scale, not just regionally. In fact, after a few months of operation, Inno-Centre attracted the attention of the mayor of Montréal, and at his request, it is setting up operations there. It was a nice coup for the City of Montréal.

"We'll never really leave Boucherville," insists Serge Bragdon. "Many of our firms will remain there, and we'll continue to follow up on their progress. Montréal represents a new phase for us, and we're ready to meet the challenge."

Inno-Centre's board of directors is composed of individuals from business circles as well as government and research bodies. Unlike the companies' management committees, which play a consultative role, the board makes numerous decisions, especially regarding the recommendations of the selection committee. "We're demanding and very discerning when choosing new member firms," maintains Bragdon. "Many factors are taken into consideration, but one of the most important aspects is the personality of the entrepreneurs."

**Control console for equipment that prepositions 2-cant logs (logs which have been cut on two parallel sides) for further milling. Developed by Autolog, an Inno-Centre Québec member.**



In just a few weeks, Inno-Centre will be setting up its offices in Montréal, in more spacious quarters. Already, a dozen or more applications for membership have been received from fledgling firms. If the board approves the decisions of the selection committee, the new member companies will be able to sign a contract for a period of one, two or three years. With the mentors' assistance, Inno-Centre will justly be called "the school for business excellence."

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**Inner view of Autolog's control system for sorting and classifying lumber or logs.**



Ice and snow sliding is a delightful sport which can be done standing, kneeling, or lying down, on a toboggan or a simple sheet of cardboard. Many children in cold countries use a toboggan even before they learn how to walk. For the first time in their lives they experience the thrill of speed, streaking down a hill pressed firmly against a brother or sister, only to land at the bottom in a burst of laughter or a profusion of tears.

In Canada, sliding sports have undergone a technological revolution in the past few years.

For the past year and a half, a Quebec company, Glacem Inc., has been producing and marketing something which happens to be one of Quebec's most abundant natural substances: ice. Glacem manufactures inside and outside ice sporting surfaces (specifically, luge tracks) for the pleasure of serious sportspeople and amateurs alike. Its customers are mainly municipal authorities wishing to offer their constituents sports activities to fill the long winter months.

"You can't rely entirely on nature for winter sports. You have to give nature a helping hand," explains André Paquay, technical advisor at Glacem, who was a civil engineer before he started the company. "For example, artificial snow has revolutionized winter sports. These days, we're enjoying a longer ski season, and an increasing number of people are practicing this sport.

"Glacem has introduced a technological concept which will allow the public to do luge sports during four months of the year, without interruption," he says.

## A Simple and Efficient Concept

The concept developed by Glacem consists of a heat exchanger in the form of a carpet made of EVA plastic, which comes in strips of 1.22 metres wide. The carpet is composed of small, six millimetre tubes running parallel to each other and containing methanol, which circulates in the carpet and is cooled by a freon compressor system.

Thus, in the case of luge tracks, the methanol maintains the ice at an ambient temperature of 8°C. When the temperature goes above freezing, the compressor has to work harder.

There are several advantages to this concept, according to Mr. Paquay. It forms ice much more quickly than nature, and the gas in the exchanger does not have to be replaced. The heat exchanger carpet is portable, and can be adapted to all types of indoor and outdoor facilities.

In May, the luge track can be easily rolled up to make room for other activities; in the fall, the carpet can be installed in just a few hours, without the assistance of specialists. And all the equipment is guaranteed. For municipalities on a tight budget, those aspects are extremely important.

"This year, the City of Repentigny installed two 33-metre-long treated-wood luge tracks over the stands of the baseball field. In the spring, it'll be really simple to take down the wooden structures supporting the tracks," said Glacem's technical advisor.

The recreation director of the Repentigny recreation centre, René Gauthier, is very pleased with this new sports facility. He cannot get over the public's reaction. "People of all ages have tried the facility, and they keep coming back. The tracks are getting more and more popular all the time. I thought kids would be the only ones to use them, but the adults are using them just as much!"

The Repentigny recreation department has used the stands in the baseball field to create a slope, thus enabling the municipality to save on the cost of treated wood required to build the structure. The stadium lights are used to illuminate the track, which starts to get dark in mid-afternoon.

"We're the first municipality in Quebec to acquire this type of structure, but I'm sure we won't be the last," adds Mr. Gauthier.

## Technology for the Benefit of Luge Enthusiasts

The secret of a good luge track is proper calculation. The slope of the Repentigny track is 27° 35 min., over a length of 33 metres. In fact, the luger slides beyond the luge track itself. The total length of the slide ends up being 160 metres, at a maximum speed of 40 km/h.

In comparison, the track used for Olympic luge events has a slope of only 10°, but the slide extends to a total length of 2500 metres. Competitive lugers can reach a speed of 130 km/h. It is the length of the track which determines the speed.

Nevertheless, accidents are rarely due to the luger's speed. The real danger is a poorly designed track. No one has ever been injured at the Repentigny facility, and more than 1000 people use the track each day.

Glacem can design and build tracks of all sizes and dimensions, but safety is always the prime concern.

The cost of the project is not determined solely by the slope of the track. Also influencing the price are the track's exposure to sunlight, the characteristics of the ground, the length of the tracks, the desired speeds, and the number of months of operation. Another determining factor is the number of tracks to be built — the more tracks you build, the lower the cost of each track.

Glacem-equipped luge track at dusk.





Canada

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A major advantage of these facilities is that they are less expensive than Olympic-type structures and, once they are built, the maintenance costs are minimal.

### The International Market

Not only have luge tracks changed with the times, but the toboggans and luges themselves have also changed, and there are many different types on the market today. Some people simply use rectangular sheets of coloured plastic which are thin and slippery, while others use wooden luges on runners, steered by two guide ropes. Competitive lugers ride their vehicles lying flat on their stomachs.

Glacem has developed a new type of luge which resembles the sheets of coloured plastic, but has a foam pad to act as a shock-absorber.

"Remember, when you're zipping down the track at 35 or 40 km/h, you're really thankful for that foam pad!" says entrepreneur André Paquay with a smile.

André Paquay markets two types of luges to developers of luge centres, and in Glacem's 18 months of operation, the firm has installed seven tracks at two Quebec centres. The first is in Repentigny, while the second — a much larger one — is in the Laurentians.

Marketing the Glacem concept is a full-time occupation. The company is not only courting the Canadian market, but is also looking to potential American buyers. Developers in Atlanta, Georgia, were shown the concept, and were enormously impressed by its numerous applications. Others in Colorado and Minnesota are seriously thinking of purchasing one of these sports facilities.

Of course, certain markets do not offer much promise. For example, it would not make sense to approach the Mexican market, since the cost of operating a centre there would be very high.

"Obviously, the operating costs for a track depend partly on the ambient temperature. In the northeastern United States, winter temperatures hover around the freezing point. Not so in Mexico. The compressors would have to work too hard. But this technology is easily exportable to places with milder climates than Montréal or Toronto," assures Mr. Paquay.

Sunlit luge track complete with equipment developed by Glacem Inc. to maintain ice surface.

### A Magic Carpet

Nevertheless, Glacem's market is not limited to northern countries. New applications for the heat exchanger carpet are broadening the company's horizons. For instance, why not combine ice sports with water sports? Glacem's luge tracks can be converted easily into water slides in the summer. This seems to be a highly interesting prospect. Unlike the centre at Repentigny, an all-season facility would be a permanent structure made of fibreglas — all you would have to do in summer is roll up the carpet to make room for a water slide. Municipalities with high population densities seeking recreational facilities could find this concept very attractive.

According to Mr. Paquay, some municipalities have even said they are ready in the near future to purchase the "Rolls-Royce" of tracks — an all-season centre featuring eight tracks of varying levels of difficulty. Amateurs could admire the pros flying at speeds of 30 to 40 km/h, almost like the Olympic events.

André Paquay keeps finding new applications for the heat exchanger carpet, which can meet a wide range of refrigeration and heating needs. It can be used on the floor of greenhouses, or outside, to protect plants from excessive temperature variations, he notes.

The heat exchanger concept can also be useful to golf courses, whose greens must be protected against wide fluctuations in temperature. If the roots are kept warm, the grass will stay greener. But even more important, Environmat (as this application of the heat exchanger is called) gives protection against sudden temperature variations in the subsoil, in the fall and spring.

So André Paquay is busy marketing all these different types of heat exchanger carpets, designed to meet a recreational need. He is very confident that things will go well. After all, people will always enjoy sliding... and nothing is easier to export than fun.

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# Canada Awards

## Innovation and Invention — Factors in Success

Innovation and invention are major factors that have ensured success to such Canadian companies as **Alcan International Limited** and **Virtual Prototypes Inc.**, both of Montréal.

The two companies were Gold Award winners in their categories in the 1988 annual Canada Awards for Business Excellence — Alcan in *Invention* and Virtual Prototypes in *Innovation*.

The 1988 ceremony saw gold, silver and bronze awards won by Canadian companies in eight categories — Small Business, Productivity, Marketing, Entrepreneurship, Labour/Management Co-operation, Innovation, Invention and Industrial Design.

### Alcan International Limited

Alcan International won the Invention category Gold Award with its development of a safe, compact and highly efficient source of standby power which could make noisy emergency generators and huge battery banks obsolete.

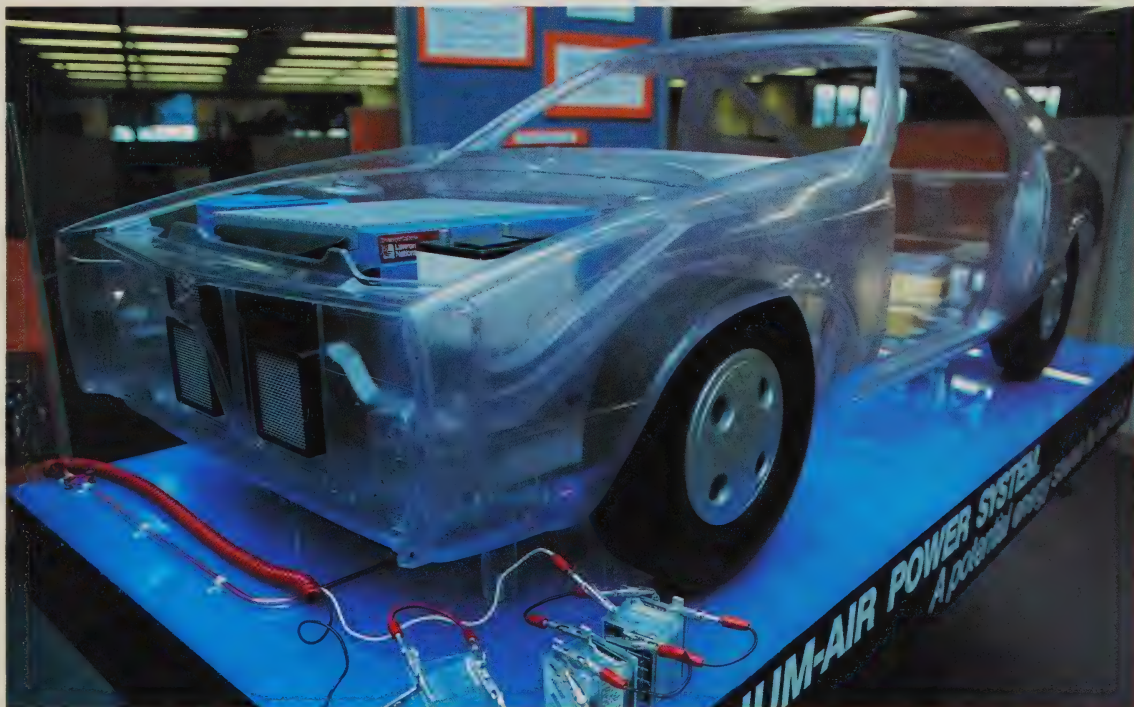
The company's invention is the first-ever refuelable aluminum battery, considered the most efficient fuel cell available. It is said to outstrip the performance of high-technology polymer electrolyte and high-temperature molten salt systems by a further 100 percent. It is also a potential energy source for on-highway vehicles and could replace the inner combustion engine.

The aluminum battery is a primary energy source, more like a fuel cell than a conventional secondary battery. It was based on caustic electrolyte, designed by Dr. Brian O'Callaghan of Alcan's Kingston Research Laboratories and patented in 1987.

The company's aim was to create a fuel, using aluminum, that would produce non-polluting vehicles with an energy source which is recyclable, easily stored and non-combustible.

The fuel cell is currently being tested at telecommunications systems in the field and indications are that it is meeting predicted energy levels.

**Alcan International Limited's award-winning power source used to power a car.**



## Virtual Prototypes Inc.

In its award-winning effort, Virtual Prototypes recognized that there was a gap in the design of software for complex computer control and display systems such as used in aircraft cockpits, car dashboards and monitoring workstations.

In some industries, such as aerospace, writing and debugging complicated software could easily delay a crucial project and, to overcome this, the company developed its *Virtual Prototyping System*, or VAPS.

VAPS replaces special-purpose computer hardware, used in control and display systems, with touch-sensitive computer graphics. Instead of spending countless hours programming software to make a prototype work, a process of drawings and selections from a menu is used by VAPS to generate the desired software automatically.

VAPS helps evaluate systems quickly without building them and without having to rely on programming experts. It also has the unique ability to develop prototypes into operational systems, eliminating redundancy associated with the development of software. In addition, VAPS helps reduce the risk of errors and costly delays caused by changes in specifications.

Virtual Prototypes' clients for its VAPS include Boeing, General Dynamics, Aerospatiale and the Canadian Department of National Defence. Transport Canada is finding VAPS useful in work on a design for a new air traffic control system.

For further information on the two award-winning companies, contact:

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(Kingston Research Location)

Virtual Prototypes Inc.

5252 de Maisonneuve West, #318

Montréal, Quebec

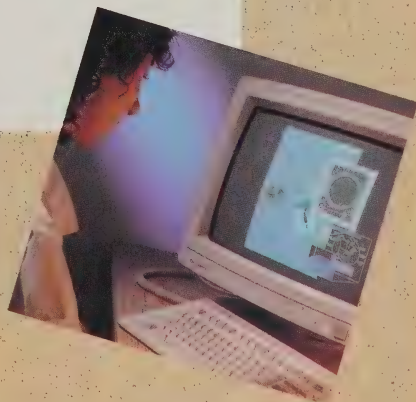
H4A 3S5

Tel: (514) 483-4712



**An award-winning software developed by Virtual Prototypes Inc. is shown as used in an aircraft cockpit display.**

**Virtual Prototypes' software used in a complex computer control system.**





# The Canadian Plastics Institute (CPI)

## Plastics — Canada's Fastest Growing Industry

**T**he Canadian plastics industry has come a long way since 1885 when a Toronto entrepreneur filed for the first patent. More than a century later, the industry is looking for new ways to use this adaptable material. Right now, plastics are used to produce everything from flexible artificial arteries to graffiti-proof wall coatings.

The plastics industry is the fastest growing in Canada, more than doubling the real gross domestic product in the last 20 years. The industry employs about 100 000 people and produces \$12 billion worth of products each year.

The Canadian Plastics Institute (CPI) is assisting the Canadian industry to go even further. It is helping it to discover and exploit the innovative technology.

The mandate of the six-year-old institute is to make the Canadian industry more competitive in the tough world of global trade. With the added pressure of free trade looming, the industry may need to be spurred to action — with support from CPI.

CPI was created in 1983 through the efforts of the Society of the Plastics Industry of Canada (SPI) with help from the then Department of Regional Industrial Expansion (now Industry, Science and Technology Canada — ISTC). ISTC continues its support through sustaining funding under its Technology Outreach Program (TOP). Substantial financial support

is also provided by the National Research Council of Canada (NRC) on an ongoing basis through its Industrial Research Assistance Program (IRAP). NRC funds two of its industrial technology advisors (ITAs) based in the CPI offices who are in contact with 150 ITAs across the country.

SPI took a look at the industry's direction and decided that the status quo was no longer an option. SPI concluded research and development could only benefit the industry if the technology made it to the marketplace instead of languishing in the laboratory.

SPI became concerned that new discoveries were rapidly being translated into products in the international market, leaving Canada behind. CPI was established to help Canadians take fully developed technology and introduce it to the North American market. Along the way, it would also encourage a whole new generation of researchers to put Canada on the map.

It sounds like a huge undertaking, but Dr. Andrew Bobkowitz, CPI president, is optimistic. He should know. Dr. Bobkowitz and his staff of six plastics industry professionals comb the world to find technologies ripe for adoption in Canada — then return to Canada to nudge companies to make the most of these technologies, and make themselves more competitive in the marketplace.

Canadians have always been plastics pioneers. The first plastics patent in Canada was granted to William Carl Zeidler of Toronto for "the polishing of cellulose nitrate", or cellulose, which was used to make early movies. In 1931, McGill University initiated some of the earliest basic research on polystyrene. Also in 1931, French Ivory Products, a Toronto company, installed the first injection moulding machine in North America.

Plastics have come a long way since the first plastic products appeared on the market. Many early products cracked and broke after exposure to frost, or faded after a day in the sun. Plastics ended up with a rather tarnished image and resin producers stepped in to regulate the end uses and improve the image.

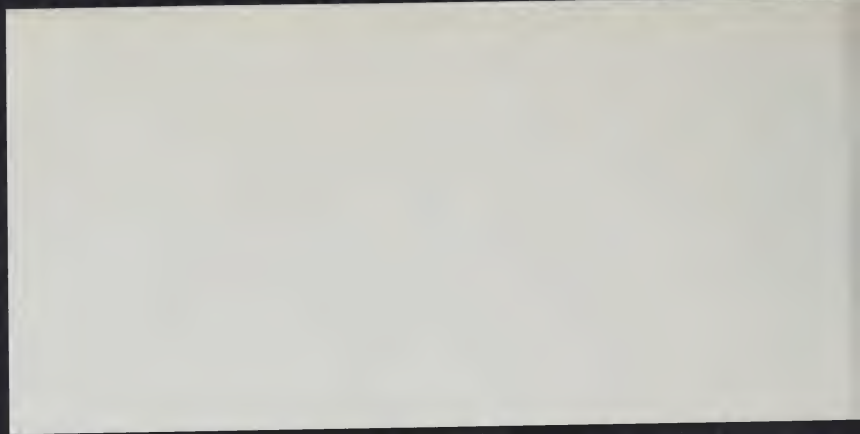
Since then, better processes have made better plastics. Today's plastics can take the toughest tests. They are harder, more durable, chip-resistant and built to withstand even acid rain.

**Plastics products manufacturing showing  
the mould and the finished products.**









Most recent plastics breakthroughs can be attributed to a better understanding of chemistry. Knowledge of molecular architecture is increasing and research is accelerating into how these building blocks of matter can be rearranged to change their nature.

CPI has a four-pronged approach to promoting the plastics industry:

- acquire new technology;
- inform the industry about its availability;
- encourage the industry to use the technology; and
- facilitate more and better research and development.

Learning about new products and processes keeps Dr. Bobkowitz and his team busy. Contacting or visiting up to 300 companies each year, the team carefully monitors reports of promising developments. Team members log thousands of kilometres in travel, read dozens of technical journals and use databases from around the world to ferret out new developments.

When Dr. Bobkowitz and his staff travel — mostly in Europe and Japan — they look for technology that is:

- ahead of current North American practice;
- ready, or almost ready, for commercial use; and
- available for licensing or joint-venture arrangements to Canadian firms for commercial exploitation.

Importing technology is nothing new, says Dr. Bobkowitz, pointing out that 98 percent of all the technology used in Canada originated somewhere else. Finding applications for already-developed technologies is much easier than starting from scratch.

And much faster, too, he adds, referring to the example of a high-strength plastic rope developed in Japan. The technology was ready and waiting; all it needed was a niche in Canada. The opportunity existed in Canada's lumber industry as a replacement for metal cables.

Getting the word out is the second priority for CPI. Every two months, the institute publishes a newsletter outlining new products and processes. Detailed monographs — state-of-the-art reports that concentrate on a specific topic — are published each year.

Seminars and presentations are another way to spread the news. Some of these seminars offer information never before available in North America. This happened last year when a Japanese researcher was invited to a seminar to discuss a super-plastic that can outperform steel.

This year, seminars will concentrate on recycling, computer-integrated manufacturing, as well as on co-operative industry-research ventures that have worked in Europe. For members who miss seminars, CPI summarizes the proceedings and prepares publicity features on innovations for the media.



**Plastics-clad airport terminal in Frobisher Bay, Northwest Territories.**

Putting the wheels in the motion to encourage the industry to use the technology is the next step. Team members keep in touch with companies trying to adopt technology and offer technical assistance in choosing the best materials and processes, and in improving new products.

About 3000 companies produce plastics, plastic products and machinery in Canada, says Dr. Bobkowitz, of which some 80 percent have fewer than 50 employees. These are the companies that will benefit the most from CPI's activities. Smaller processors are usually eager to use the institute's services because they don't have the resources or the budgets to keep up with worldwide trends.

The last component of CPI's approach is fostering Canadian research. This strategy will pay big dividends in the long run, according to Dr. Bobkowitz. Promoting plastics research in Canada will result in more skilled professionals coming out of universities, better pure and applied research for use, and a bigger network of expert consultants — a commodity Canada needs desperately, he adds.

Even though Canadian universities carry out excellent research (Dr. Bobkowitz cites McGill University, McMaster University, Queen's University, the University of Toronto and Montréal's École Polytechnique as examples), CPI believes a great deal more can be done. The institute tries to bring universities and the industry together to match their goals more closely. As part of its educational thrust, CPI subscribes to the Ontario Centres of Excellence program, encourages the establishment of a university chair in plastics research and represents the views of industry.

As well, CPI has participated in conferences, including last year's National Conference on Technology and Innovation, at which the federal government announced Higher Performance Polymeric Systems under the National Networks of Centres of Excellence program. The initiative is designed to link all major plastics research centres through a network. The CPI was represented both as a delegate and as one of the few industrial exhibitors.





CPI has developed a co-operative research consortium to show Canadians research opportunities and summarize plastics research in Canada. It keeps the government informed by offering technical education to groups such as senior civil servants, and by providing advice to such groups as the House of Commons Standing Committee on Research, Science and Technology.

CPI also helps drum up funds for creators of new technologies. The institute continues to navigate the channels of government funding, including the research assistance program of the National Research Council, and works with 150 industrial technology advisors across the country, including two resident advisors.

The institute's market emphasis for 1989 is the construction industry. And small wonder. This industry is largest untapped market for plastics. Builders snap up about 22 percent of the plastics produced by the Canadian industry.

Still, on a tonnage basis, that accounts for only two percent of the weight of all construction materials. If the industry could boost this to three percent, the plastics market would increase 50 percent. Wood, stone, iron, concrete and glass have all had their day. Now it's plastics' turn, says Dr. Bobkowitz.

When plastics were first introduced to construction more than 40 years ago, builders saw them as cheap replacements for traditional building materials. They discovered that they were lightweight, easy to process, adaptable to exciting new designs and, best of all, resisted corrosion.

Builders are now using plastics in many ways. Homeowners can buy plastic shingles that look like cedar but last longer, and flexible vinyl seals that keep patio stones from buckling. Other products range from practical and commonplace plastic pipes to the truly innovative.

One example of innovation at its finest is a demonstration home in Orillia, Ontario. Outside, the house is a geodesic dome. But the interior can be redesigned every day, with imagination and the help of plastics.

The interior walls of the house are double panes of clear glass that give the home an open feeling. By blowing polystyrene beads between the panes, they become opaque. The beads block out light and provide insulation, and can be used in the walls in several combinations for different light levels and degrees of insulation.

Plastics may even be used for projects that have never been attempted before. For centuries, a bridge linking Europe to Africa across the Strait of Gibraltar has been a dream. But such a bridge was an engineering impossibility using traditional building materials, which simply could not support the weight of such a long structure.

But, according to Swiss researchers, carbon-reinforced plastics bonded to the bottom of the bridge span could reduce the weight on the concrete beams by 50 percent. The plastic composite would absorb tension while the concrete does what it does best — absorb compression.

Plastics are already being put to good use by designers right here in Canada. In the Arctic, plastics are good alternatives to highly expensive wood. They offer excellent insulation, are fire resistant and can be moulded into appealing shapes.

Plastics have been used in several building projects including an observatory, the Froebisher Bay airport (designed by Montréal architect Guy Gerin-Lajoie) and several Inuit schools. When one of the schools caught fire, plastics again proved their worth. The wooden part of the school was scorched but the plastic portion was untouched.

Plastics let designers do things that are impossible with traditional materials. But dramatic new approaches need designers who are willing to turn their patterns of thought upside down, says Dr. Bobkowitz. CPI wants Canadian companies to break out of the traditional way of thinking.

A Japanese firm, for example, developed a way to use plastic mesh to make concrete plates — a technology CPI would like to see Canadians adapt. The mesh eliminated the need for clumsy wooden forms in building concrete walls. The result is a corrosion-resistant wall with a sophisticated look that can be formed into any shape and thickness.

The Japanese are studying ways to use the mesh to build curtain walls for nuclear reactors. Other mesh walls are used as seawalls in Tokyo harbour.

Some Canadian firms have already grabbed opportunities in plastics and turned them into success stories. Mirotech, a Toronto firm, has adapted a mould-making process. Nickel vapour is deposited on the original model and peeled away when the process is over. The form is then backed with metal and ready for use. This process is much faster than the time-consuming, traditional method and is just as accurate. It can be used to mould anything from automotive parts to packaging products.

Getting plastics accepted into every niche won't be easy, Dr. Bobkowitz admits, especially since it must compete with materials and practices that have been used for centuries.

The solution, he says, is to demonstrate that plastics offer higher quality at a lower cost without sacrificing safety. In fact, he adds, plastics make some products safer. Plastics are new structural materials in construction and need to establish a track record. For this, experiments must be developed to collect data over long periods of time.

Plastics are always changing, adapting, improving and are continuing to replace other materials. Plastics' ability to change makes it easy to find new applications, says Dr. Bobkowitz enthusiastically.

"The one thing that remains is the ability of plastics to continually surprise us."

For more information, please contact:  
**Canadian Plastic Institute**  
 1262 Don Mills Road  
 Don Mills, Toronto, Ontario  
 M3B 2W7  
 Tel: (416) 441-3222

## Leader in Radiation Monitoring

**T**he very air we breath is becoming increasingly hazardous as the human race dumps more and more of its waste into it. Pollutants of all kinds float unseen and are inhaled. One source of pollution are the radioactive decay products of radon, a naturally occurring radioactive gas, part of the decay chain of uranium which occurs throughout the earth's crust.

R.A.D. Service and Instruments Ltd. device for monitoring radon gas decay products.

A Canadian company, R.A.D. Service and Instruments Ltd. of Scarborough, Ontario, is a leader in the field of radiation monitoring. The company has developed a method of monitoring the levels of harmful radon decay products, called "radon daughters", in buildings and homes using its Model M-1 Time-Averaged, Working Level Surveymeter.

### "Radon Daughters"

"Radon daughters" are short-lived products which attached themselves to aerosols in the air and, if inhaled, are partly deposited on the human respiratory tract. In many countries, "radon daughters" constitute a major part of the natural radiation dose to human beings.

Since the fluctuations of "radon daughters" are subject to variations in radon levels and to aerosol conditions, the estimation of risk to humans is measured by their time-averaged value on a working level basis.

RAD's M-1 offers a risk estimation using this accurate and reliable measurement. It is considered the simplest system currently available for the precise determination of time-averaged working level of "radon daughters", ideal for indoor monitoring.

### M-1 Surveymeter

The M-1 consists of a pump and a detecting head with a polycarbonate plastic compound used in a solid-state track registration system as detector. There are no electronic parts and the only moving part is the pump.

The solid-state track registration has proved a highly reliable means of recording alpha particles from the "radon daughter" products. Night-to-day variations are automatically averaged and the M-1 provides an accurate average working level value for any sampling period from three days to several weeks.

Available in either 110V (60 cycles) or 220V (50 cycles) versions, the M-1 is easy to use. It plugs into a standard AC outlet and, after running for a number of days, the detector can be processed and the results available in a few days.

### R.A.D. Service and Instruments Ltd.

R.A.D. has been successfully developing and manufacturing radiation protection instruments and providing professional services for the past 10 years. It is involved in three main areas — instrument design and production; monitoring devices; and professional services.

The company has designed and produced a broad range of monitoring devices for both indoor and outdoor use. It is listed as the only North American firm in its field that manufactures its own instruments, performs mail service and conducts its own laboratory processing.

For further information, contact:  
R.A.D. Service and Instruments Ltd.  
50 Silver Star Boulevard, Unit 208  
Scarborough, Ontario  
M1V 3L3  
Tel: (416) 298-9200  
FAX: (416) 298-9220  
Telex: 065-26274



# Technology Transfers

## Offered

### Canada

- Transmission System
- Abdominal Rope
- Ultrasonic Image Camera Using Arrays of Acoustic Waveguides
- Production of Immunogens by Antigen Conjugation to Liposomes
- Lithographic X-Ray Source
- Recovery and Purification of Silica
- Method for On-Line Thickness Monitoring of a Transparent Film
- Method and Apparatus for Evaluating the Degree of Cure in Polymeric Composites
- Manufacturing an Anaerobic, Biocatalytic Sandwich Reactor
- Device for Detecting Pinholes in a Moving Sheet
- Computer Program for Contour Plotting
- Bacterial Control of Bertha Armyworm Larvae (Memestra Configurata)
- Automatic Aseptic Sampling Apparatus
- Collinear Acousto-Optic Interaction in Cladded Fibres

### Austria

- Electronic Control Systems
- Silos for Bulk Goods

### Germany, Federal Republic of

- Process for Purification of Drinking Water

### Great Britain

- Vehicle Loading System

### The Netherlands

- Plastic Pipe Systems

### Switzerland

- Wheelchair Accessories

## United States

- Rigid-Rod Molecular Composites
- A New Series of High-Performance Epoxy Resins
- Advanced Phase-Change Thermal Energy Storage Materials for Heating and Cooling Applications
- Fluorocarbon Cleaning Process for Cleaning Strengthened Nickel Superalloys
- Solar-Powered Oven
- Water Proofing for Concrete
- Speech and Voice Recognition System
- Baking Machine
- Wind Turbine
- Folding Binoculars
- Safe Insecticide
- Educational Doll
- Non-Toxic Stain Remover
- Anti-Smoking Video
- Economical Disinfectant
- Ultraviolet Water Purifier
- Automatic Water Purifier
- Truck Unloading Platform
- Diagnostic System

# Offered

## Canada

### Transmission System

Through a licensing or joint-venture arrangement, a Canadian inventor is offering to manufacturers of bicycles or of light motor-driven devices or machinery his invention — a light automatic transmission system for belt or chain-driven transmissions. Interested parties should be capable of developing and testing a prototype.

*Write to:* John D. Pootmans, 27 Kilbarry Crescent, Ottawa, Ontario K1K 0G9; Tel: (613) 233-8716 or 749-6682.

### Abdominal Rope

A Canadian inventor is offering the manufacturing and marketing rights, under a licensing, joint-venture arrangement or outright sale of his patent rights, for an abdominal rope. It is claimed that the use of this rope will strengthen and tone the abdomen, arms, shoulders, hands and back muscles.

*Write to:* SOLON, O'JOANNIS GIANNAKOS VIV PD, Prince Continent's, Export Canada of the Royal Group, P.O. Box 7367, Station E, Calgary, Alberta T3C 3M2; Tel: (403) 249-2000

*The following are offers of technology transfer available from the Canadian Patents and Development Limited.*

### Ultrasonic Image Camera Using Arrays of Acoustic Waveguides 8112

A technique for making an ultrasonic image camera using a bundle of acoustic waveguides where delay lines are provided by means of different waveguide lengths. The technique is said to be far simpler and more powerful than other known techniques used for ultrasonic imaging systems. Applications include medical diagnostic instrumentation.

### Production of Immunogens by Antigen Conjugation to Liposomes 8188

This is a technique for the preparation of antigen-liposomes bonded composites with a minimum protein-to-lipid ratio. These immunogens provide an enhanced immune response desirable for the production of antibodies.



### **Lithographic X-Ray Source 8297**

This pulsed plasma X-ray source is designed to be used in commercial sub-micron lithography to make densely packed, large-scale integrated circuits. It offers high conversion efficiency of electrical energy into 1 keV X-ray emission from a source of sub-millimetre size, with the X-ray emission being substantially constant from pulse to pulse and capable of being fired at high repetition rates (10 to 100 Hz).

### **Recovery and Purification of Silica 8352**

A three-step process is described for the recovery of costly isotopes of silicon from dilute aqueous solution. The resulting high-purity silica residue may be used in plastic-moulded semiconductor devices or for the production of high-purity silicon for silicon chips. This process can successfully replace other time-consuming, multi-step procedures.

### **Method for On-Line Thickness Monitoring of a Transparent Film 8559**

This is a new infrared absorption technique for measuring the thickness of polymeric films which are either free-standing or coated on a substrate. It consists of projecting a polychromatic light on the film to provide a signal from which it is possible to eliminate errors caused by surface effects or by scattering due to pigments or impurities in the film. This improved technique is also more convenient to use than other similar, existing techniques.

### **Method and Apparatus for Evaluating the Degree of Cure in Polymeric Composites 8610**

This is a non-destructive technique for monitoring the degree of cure in carbon-fibre-reinforced plastics and other thermoset polymers, prior to, during and after processing, to maximize mechanical performance. The technique is more versatile than spectroscopic techniques which are not suitable for light-absorbing composites. It is also simpler and faster than thermoanalytical techniques.

### **Manufacturing an Anaerobic, Biocatalytic Sandwich Reactor 8688**

A manufacturing process is described for building an anaerobic, biocatalytic sandwich reactor for treating liquids. The sandwich reactor has an ultrafiltration membrane on one side and a reverse osmosis membrane on the other and will operate continuously. It has been used to produce ethanol from glucose.

### **Device for Detecting Pinholes in a Moving Sheet 8748**

This device is designed for detecting flaws in a moving sheet of material. Unlike existing techniques, the technique used is compatible with typical industrial requirements for speed and accuracy over extended fields of view. Surface flaws or pinholes a few tens of microns in diameter can be detected.

### **Computer Program for Contour Plotting 8892**

Using either cartesian or polar co-ordinates, this program machine plots smooth contour lines from data sets containing at least 12 and up to 2000 points. It also calculates average height and volume under 3-D surfaces. At present, it is the only known machine plotting program operable on a personal computer (HP 9836). It is coded in BASIC 2.

### **Bacterial Control of Bertha Armyworm Larvae (*Memestra Configurata*) 8919**

Selected strains of *Bacillus Thuringiensis*, highly toxic to the larvae of the Bertha Armyworm, have been cultured for use as insecticides to control infestations in canola and other cruciferous crops. The bacteria are more environmentally acceptable than currently used toxic chemicals.

### **Automatic Aseptic Sampling Apparatus 8993**

This apparatus allows the retrieval of uniform sterile liquid samples from bioreactors or other containers, through a three-way valve system. The manually operated or automatically controlled system prevents contamination and allows the sample to be returned to the bioreactor. It is useful in sampling operations of sterile streams (e.g., food and beverage or pharmaceutical industries).

### **Collinear Acousto-Optic Interaction in Cladded Fibres 9027**

This is related to a new acousto-optic device in which ultrasonic waves are used to modulate optical waves. The device, in which acoustic waves propagate along the same longitudinal axis of the fibre, is efficient, simple, miniature and economical. It is also compatible with standard optical fibre systems.

*For further information on the above items, write to:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528.

*Please quote the appropriate case number.*

## **Austria**

### **Electronic Control Systems**

An Austrian company is offering to Canadian companies the know-how, training and equipment for the development and production of electronic control systems and combinations of multi-train control systems for model railways.

*Write to:* P. W. Ziegler, ZIMO Elektronik, Schönbrunnerstrasse 188, A-1120 Vienna, Austria.

### **Silos for Bulk Goods**

An Austrian company is offering to a medium-size metal working company, through a licensing or joint-venture arrangement, the technology for construction of silos, from three to 100 tonnes, for bulk goods, such as flour, sugar, starch, salt, etc.

*Write to:* The Austrian Trade Commissioner in Toronto, 2 Bloor Street East, Suite 3330, Toronto, Ontario M4W 1A8; Tel: (416) 967-3348;

Telex: 06-23196 Autrad Tor; FAX: (416) 967-4101.

## Germany, Federal Republic of

### Process for Purification of Drinking Water

A German company is offering to Canadian companies turnkey plants and the technology and technical training for a purifying process to produce drinking water without adding chemicals. The process is said to be applicable to the brewery, food processing and pharmaceutical industries and to public buildings and camps.

*Write to:* Klaus Kempf, UNIDO Investment Promotion Service, P.O. Box 10 20 65, D-5000 Cologne 1, Federal Republic of Germany; Telex: 17221349.

## Great Britain

### Vehicle Loading System

A British company is offering to Canadian firms, through a licensing arrangement, the manufacturing and marketing rights to its KAYBE Penetrator Vehicle Loading System. By using a telescopic continuous belt, this loader can load or unload a vehicle with continuous adjustment of penetration depth.

*Write to:* H. Matthew Pollard and Associates Ltd., Brownacres, 145 Sapcote Road, Burbage, Leics, United Kingdom, LE10 2AT; Tel: 0455-611733; Telex: 333388 LINK G.

## The Netherlands

### Plastic Pipe Systems

A company in the Netherlands is offering to Canadian plastics processors, under licensing and technical assistance agreements, the know-how for manufacturing plastic pipe systems.

*Write to:* W. H. Ros, Business Unit Manager, Wavin Overseas bv, Rollepaal 19, NL-7700 AD Dedemsvaart, The Netherlands; Telex: 30732 wavov nl; FAX: 05230-24600.

## Switzerland

### Wheelchair Accessories

A Swiss company is offering, through a licensing arrangement, the manufacturing and marketing rights for its wheelchair umbrella. The umbrella is claimed to be adjustable in all directions and will also protect the wheelchair attendant. It comes with a storage bag and can be mounted or dismantled by the wheelchair user. As an additional accessory, a spotlight can be mounted on the umbrella arm.

*Write to:* Krummenacher, Krummenacher Gerätebau, Chlestrasse 12, CH-8906 Bonstetten ZH, Switzerland; Tel: (01) 700 25 88.

## United States

*The following inventions are available for licensing from the University of Dayton Research Institute, Dayton, Ohio.*

### Rigid-Rod Molecular Composites

The Institute has established a new approach to polymeric materials through the use of intrinsically rigid-rod polymers to form "molecular composites". These materials are molecular-level analogs of conventional state-of-the-art composites of chopped fibreglass. They are dispersed in a thermoplastic or thermoset matrix of the type used in the automotive industry. The Institute replaced chopped fibreglass by intrinsically rigid-rod molecules, thus avoiding interfacial problems encountered in conventional fibre/matrix composites. Protected by U.S. Patent.

### A New Series of High-Performance Epoxy Resins

The Institute has synthesized a series of new epoxy resins claimed to have properties superior to those of commercially available materials. Evaluations of cured and post-cured neat castings of these new resins have shown that the Institute's materials are less brittle than state-of-the-art epoxies, and their thermal properties are equal to or better than those of existing epoxy materials. It is also claimed that the moisture sensitivity of these new epoxy resins is much lower than that of the commercially available resins. U.S. Patent pending.

### Advanced Phase-Change Thermal Energy Storage Materials for Heating and Cooling Applications

The Institute has defined a series of commercially available, low-cost crystalline alkyl hydrocarbons that melt and freeze congruently in the temperature range of 15°C to -80°C, have a high heat-of-fusion, and are chemically inert and non-toxic. Three U.S. patents have been issued. Patents are pending in Canada, Japan and several European countries.

### Fluorocarbon Cleaning Process for Cleaning Strengthened Nickel Superalloys

Developed by the Institute, this process uses the controlled decomposition of a fluorocarbon resin (Teflon) to produce an extremely reactive atmosphere capable of converting normally stable oxides, such as  $\text{TiO}_2$ , and  $\text{Al}_2\text{O}_3$ , to volatile fluorides. Conventional metallurgical process equipment is employed and the effluent products are non-toxic and non-polluting. Protected by patents in the United States, Canada, EPO and other countries.

*For further information on the above inventions, write to:* the University of Dayton Research Institute, 300 College Park, Dayton, Ohio, OH 45469; Tel: (513) 229-2113.

*The following are joint-venture and licensing opportunities from American companies.*

### Solar-Powered Oven

Burns-Milwaukee, Inc. seeks joint-venture partners to produce its solar-powered oven that cooks and bakes.

### Water Proofing for Concrete

ConSeal International Corporation seeks licensees to produce its easy-to-apply water proofing for concrete.

### Speech and Voice Recognition System

Covox Inc. is looking for licensees for its system that adds speech and voice recognition to IBM and IBM-compatible personal computers.

### Baking Machine

E. Christensen Co., Inc. offers a joint-venture or licensing arrangement for its fast and efficient baking machine.

# Requested

## Wind Turbine

Earth Labs Inc. seeks joint-venture partners for its efficient, high-output wind turbine.

## Folding Binoculars

Innovational Products Co. is seeking licensees for its inexpensive folding binoculars.

## Safe Insecticide

Insecta International Inc. is offering its safe insecticide with long-term effect for a joint-venture arrangement.

## Educational Doll

A doll that is claimed to dispel the fear of darkness is offered to licensees by J. & R. Enterprises, Inc.

## Non-Toxic Stain Remover

Lustre-Glo seeks licensees for its non-toxic stain remover.

## Anti-Smoking Video

A video program that helps stop smoking is available for licence from MMI Video Inc.

## Economical Disinfectant

A licensee is sought by Omnitec Medical Corporation for its economical disinfectant.

## Ultraviolet Water Purifier

A water purifier using ultraviolet light is offered for licensing arrangement by Pura Inc.

## Automatic Water Purifier

Pure Water, Inc. seeks a licensee for its automatic water purifier.

## Truck Unloading Platform

A platform that is used to unload trucks easily and efficiently is offered to a licensee by Straight Engineering Co.

## Diagnostic System

Transimatics seeks a licensee for its diagnostic system that is said to be fast and complete.

*For more information on the above products, please contact the Consulate General of the United States of America, 1000-615 Macleod Trail S.E., Calgary, Alberta T2G 4T8; Tel: (403) 265-2116*

## Requested

### Canada

- Food Ingredient Products

### Bangladesh

- Inks and Lacquers

### Belgium

- Street Fixtures

### Brazil

- Saws and Cutting Machines
- Analytical Instrumentation or Sensors

### France

- Boiler Components
- Automated Mechanical Handling Products and Systems

### Great Britain

- Hospital Supplies and Laboratory Equipment

### Greece

- Aluminum Sheets and PVC Packaging

### Japan

- Miscellaneous Products and Technology

### Peru

- Phyto-Pharmaceutical Products

### United States

- Health Care Products

## Canada

### Food Ingredient Products

A Canadian company wishes to acquire, through licensing or other arrangements, the manufacturing and marketing rights of new food ingredient products. *Write to:* Bruce Gitelman, Vice-President, UFL Foods Inc., 6320 Northwest Drive, Mississauga, Ontario L4V 1J7; Tel: (416) 671-0808; Telex: 037-3902; FAX: (416) 671-0809.

## Bangladesh

### Inks and Lacquers

A Bangladesh manufacturer of wooden pencils and black and coloured lead, seeks technical know-how to manufacture offset printing inks and lacquers. *Write to:* A. Martin, Managing Director, Bengal Pencils Limited, House No. 2, Road No. 3, Sector-1, Uttara Model Town, Dhaka, Bangladesh; Telex: 642472 RPD-BJ.

## Brazil

### Saws and Cutting Machines

A Brazilian manufacturer of band saws and cutting machines seeks joint-venture or licensing arrangements for the local manufacture and export of machine tools.

*Write to:* João Candido dos Santos, Director, Franho-Maquinas e Equipamentos S.A., C.P. 30, Rua Marco Aurelio 485, 13280 Vinhedo, São Paulo, S.P., Brazil.

### Analytical Instrumentation or Sensors

A Brazilian company is seeking, through a licensing arrangement or joint venture, technology related to analytical instrumentation or sensors for use in laboratories or industrial areas.

*Write to:* Francisco Forés Medina, Director, Digimed Industria Eletronica Ltda, Rua Ampere, 460-Socorro, São Paulo 04762, Brazil; Tel: 522-9844; Telex: (011) 80138.



## European Community

*The following are requests for transfer of technology from country members of the European Community (E.C.).*

### Belgium

#### **Street Fixtures** BRE/0155/46/EN

A Belgian company, specialising in the supply of street fixtures to public administrations, wishes to extend its line of products with readily marketable related items.

### France

#### **Boiler Components** BRE/0141/31/EN

A French manufacturer of boiler equipment and agri-food machinery, wishes to expand its product line in the field of boiler components.

### Great Britain

#### **Hospital Supplies and Laboratory Equipment** BRE/0075/92/EN

A British company wishes to acquire, through a joint-venture or other marketing arrangement, hospital medical supplies and laboratory equipment.

### Greece

#### **Aluminum Sheets and PVC Packaging** BRE/0145/49/EN

A Greek company, specializing in packaging, is seeking a joint-venture or other type of arrangement with a manufacturer of sheets of aluminum in rolls and of PVC for domestic use and packaging of foods

*For more information on the above technology transfer requests from E.C. countries, write to: Task Force SME, Business Cooperation Centre, Commission of the European Communities, rue d'Arlon 80, B-1040 Bruxelles, Belgium; Tel: 02/236 1676; FAX: 236.12.41; Telex: 61.655 BURA P B.*

*Please quote the appropriate reference number.*

## France

### **Automated Mechanical Handling Products and Systems**

A development agency, representing companies in France, is interested in acquiring, through licensing, joint-venture or strategic partner arrangements, new products and systems related to automated mechanical materials handling ranging from bulk handling to robotized industrial mechanical handling.

*Write to:* John W. Morehead, President, Technology Search International, Inc., 500 East Higgins Road, Elk Grove Village, Illinois, IL 60007, U.S.A.; Tel: (312) 593-2111; Telex: 754296 TECH UD.

## Japan

### **Miscellaneous Products and Technology**

A group of Japanese firms are seeking, through licensing, joint-venture distribution agreements or other arrangements, new products and/or technologies in — medical equipment and devices; computer image software; measuring instruments; composite and advanced materials; medical and dental materials; die-casting technologies; water treatment technologies; process engineering technology; optical materials technology; gold mine development projects.

*Write to:* John W. Morehead, President, Technology Search International, Inc., 500 East Higgins Road, Elk Grove Village, Illinois, IL 60007, U.S.A.; Tel: (312) 593-2111; Telex: 754296 TECH UD.

## Peru

### **Phyto-Pharmaceutical Products**

A Peruvian company wishes to acquire technical know-how for the manufacture of such phyto-pharmaceutical products as tablets, capsules, unguents and ointments, conforming to the standards set by the World Health Organization.

*Write to:* Dr. L. Pena M., ITEFAR, Av. Higuera 439, Lima 33, Peru.

## United States

### **Health Care Products**

An American manufacturer of woven and non-woven health care products is seeking new and innovative technologies and products in these areas, specially in the low-cost barrier technologies or materials.

*Write to:* John W. Morehead, President, Technology Search International, Inc., 500 East Higgins Road, Elk Grove Village, Illinois, IL 60007, U.S.A.; Tel: (312) 593-2111; Telex: 754296 TECH UD.

# Special Events

## Summary

### Canada

- WORLD ENERGY CONFERENCE  
Montréal — September 1989
- EXPOCAM '89  
Montréal — October 1989
- GROCERY SHOWCASE CANADA '89  
Toronto — October 1989
- WMS '89  
Toronto — October 1989

### China, People's Republic of

- AUTOMOTIVE CHINA 89  
Shanghai — July 1989

### France

- INTERNATIONAL LEATHER WEEK  
Paris — September 1989
- INTERNATIONAL ELECTRONIC  
COMPONENTS EXHIBITION  
Paris-Nord — November 1989

### Germany, Federal Republic of

- INTERBRAU '89  
Munich — August-September 1989
- INTERNATIONAL GARDEN TRADE FAIR  
Cologne-Deutz — September 1989
- REHA  
Düsseldorf — September 1989
- 9th EUROPEAN PHOTOVOLTAIC  
SOLAR ENERGY CONFERENCE AND EXHIBITION  
Freiburg — September 1989
- INTERKAMA  
Düsseldorf — October 1989
- S+B COLOGNE  
Cologne-Deutz — November 1989

### Great Britain

- OFFSHORE EUROPE  
Aberdeen, Scotland — September 1989
- INTERPLAS  
Birmingham, England — September 1989

### Greece

- AUTO/MOTO  
Thessaloniki — October 1989
- INFOSYSTEM  
Thessaloniki — November 1989
- HOTELIA  
Thessaloniki — November 1989
- EXPLORIA  
Thessaloniki — November 1989

### India

- CLOTHING AND FOOTWEAR TECHNOLOGY  
FOR INDIA  
New Delhi — October 1989
- OFFICE AND BANK TECHNOLOGY FOR INDIA  
New Delhi — October 1989

### Korea, Republic of

- KOREENERGY 89  
Seoul — September 1989

### United States

- Licensing Executives Society  
U.S.A./Canada Annual Meeting  
Maui, Hawaii — October 1989

## Canada

### WORLD ENERGY CONFERENCE 14th Congress, Energy for Tomorrow

Montréal

September 17 to 22, 1989

*Write to:* Canadian National Committee,  
World Energy Conference, Suite 305,  
130 Albert Street, Ottawa,  
Ontario K1P 5G4; Tel: (613) 993-4624.

### EXPOCAM '89

#### Showcase for Suppliers to the Trucking Industry

Place Bonaventure

Montréal

October 20 to 22, 1989

*Write to:* Jack McLean, Show Manager,  
Southex Exhibitions, 1450 Don Mills Road,  
Don Mills, Ontario M3B 2X7; Tel: (416) 445-6641;  
Telex: 06-966612.

### GROCERY SHOWCASE CANADA '89 Food and Equipment Display

Toronto Convention Centre

Toronto

October 22 to 24, 1989

*Write to:* Donna Leigh, Show Manager,  
Grocery Showcase, 101 Duncan Mill Road,  
Suite 405, Don Mills, Ontario M3B 1Z3;  
Tel: (416) 449-3020.

### WMS '89

#### Woodworking Machinery and Supplies Show

Exhibition Place

Toronto

October 27 to 29, 1989

*Write to:* Lisa Coulson, Cahners Exposition Group,  
Box 3833, 999 Summer Street, Stamford,  
Connecticut, CT 06905, U.S.A.; Tel: (203) 964-0000.

## China, People's Republic of

### AUTOMOTIVE CHINA 89 5th International Exhibition for the Vehicle Industry

Shanghai, People's Republic of China

July 5 to 10, 1989

*Write to:* E+E EDIT EXPO INTERNATIONAL,  
12, rue Vauvenargues, 75018 Paris-France;  
Telex: 283 284 F EDIXPO.

## France

### INTERNATIONAL LEATHER WEEK

Porte de Versailles

Paris

September 16 to 19, 1989

*Write to:* Promosalons, Salons Spécialisés Français,  
C.P. 1302, Place Bonaventure, Montréal  
(Québec) H5A 1H1; Tel: (514) 861-7841;  
Telex: 05-25534 PROGEXCO MTL.

## **INTERNATIONAL ELECTRONIC COMPONENTS EXHIBITION**

Villepinte

Paris-Nord

November 13 to 17, 1989

*Write to:* Promosalons, Salons Spécialisés  
Français, C.P. 1302, Place Bonaventure, Montréal  
(Québec) H5A 1H1; Tel: (514) 861-7841;  
Telex: 05-25534 PROGEXCO MTL.

## **Germany, Federal Republic of**

### **INTERBRAU '89**

#### **Exhibition of Products and Techniques for the Brewery and Beverage Industries**

Munich Exhibition Centre

Munich, Federal Republic of Germany

August 25 to September 1, 1989

*Write to:* Unilink, 5 Donalda Crescent,  
Agincourt, Ontario M1S 1N5; Tel: (416) 291-6359;  
Telex: 06-968027; FAX: (416) 291-0025.

### **INTERNATIONAL GARDEN TRADE FAIR**

Cologne Trade Fair Centre

Cologne-Deutz, Federal Republic of Germany

September 10 to 12, 1989

*Write to:* Edel Wichmann, Cologne International  
Trade Shows, 480 University Avenue, Suite 1410,  
Toronto, Ontario M5G 1V2; Tel: (416) 598-3343;  
Telex: 06-23581; FAX: (416) 598-1840.

### **REHA**

#### **International Congress and Exhibition on Aids for the Disabled**

Fairgrounds

Düsseldorf, Federal Republic of Germany

September 23 to 27, 1989

*Write to:* P. R. Charette Inc., 5890 Monkland Avenue,  
Suite 206, Montréal, Quebec H4A 1G2;  
Tel: (514) 489-8671.

### **9th EUROPEAN PHOTOVOLTAIC SOLAR ENERGY CONFERENCE AND EXHIBITION**

Freiburg, Federal Republic of Germany

September 25 to 29, 1989

*Write to:* Prof. G. Wrixon or Dr. S. McCarthy, NMRC,  
University College, Lee Maltings, Prospect Row,  
Cork, Ireland.

### **INTERKAMA**

#### **Exhibition for Instrumentation and Automation**

Fairgrounds

Düsseldorf, Federal Republic of Germany

October 9 to 14, 1989

*Write to:* P. R. Charette Inc., 5890 Monkland Avenue,  
Suite 206, Montréal, Quebec H4A 1G2;  
Tel: (514) 489-8671.

### **S+B COLOGNE**

#### **International Exhibition and Congress for Sports, Swimming Pool and Leisure Facilities**

Cologne Trade Fair Centre

Cologne-Deutz, Federal Republic of Germany

November 8 to 11, 1989

*Write to:* Edel Wichmann, Cologne  
International Trade Shows, 480 University Avenue,  
Suite 1410, Toronto, Ontario M5G 1V2;  
Tel: (416) 598-3343; Telex: 06-23581;  
FAX: (416) 598-1840.

### **Great Britain**

### **OFFSHORE EUROPE**

#### **Products and Equipment for the Offshore Oil and Gas Industry**

Exhibition and Conference Centre

Aberdeen, Scotland

September 5 to 8, 1989

*Write to:* Spearhead Exhibitions Ltd., Rowe House,  
55/59 Fife Road, Kingston-Upon-Thames, Surrey  
KT1 1TA, England; Telex: 928042.

### **INTERPLAS**

#### **International Plastics and Rubber Exhibition**

National Exhibition Centre

Birmingham, England

September 1989

*Write to:* Industrial and Trade Fairs Ltd.,  
Radcliffe House, Blenheim Court, Solihull,  
West Midland B91 2BG, England.

### **Greece**

### **AUTO/MOTO**

#### **2nd International Exhibition for Motorcar, Motorcycle and Accessories**

HELEXPO Halls

Thessaloniki, Greece

October 7 to 15, 1989

### **INFOSYSTEM**

#### **3rd International Exhibition of Information Systems**

HELEXPO Halls

Thessaloniki, Greece

November 1 to 5, 1989

### **HOTELIA**

#### **2nd International Exhibition of Equipment and Catering for Hotels, Restaurants, Pastry Shops, Bakeries, Hospitals, Shops**

HELEXPO Halls

Thessaloniki, Greece

November 16 to 20, 1989

### **EXPLORIA**

#### **5th International Exhibition for Boats, Caravans, Camping and Sports**

HELEXPO Halls

Thessaloniki, Greece

November 18 to 26, 1989

*For the above exhibitions in Greece, write to:*  
HELEXPO, 154, Egnatia Str., GR 546 36  
Thessaloniki, Greece, Telex: 0412291;  
*or to:* Greek Commercial Section, Place Bonaventure,  
P.O. Box 303, Montréal, Quebec H5A 1B4.

### **India**

#### **CLOTHING AND FOOTWEAR TECHNOLOGY FOR INDIA**

#### **International Textile, Garment Making and Shoe Manufacturing Exhibition**

Pragati Maidan

New Delhi, India

October 3 to 7, 1989

#### **OFFICE AND BANK TECHNOLOGY FOR INDIA**

#### **International Office and Bank Technology, Computer and Communications Equipment Exhibition**

Pragati Maidan

New Delhi

October 3 to 7, 1989

*For the above exhibitions in India, write to:*  
Spearhead Exhibitions Ltd., Rowe House,  
55/59 Fife Road, Kingston-Upon-Thames,  
Surrey KT1 1TA, England; Telex: 928042.

### **Korea, Republic of**

### **KORENERGY 89**

#### **International Exhibition on Energy Sources Management, Energy Saving Technology and Equipment**

Seoul, Republic of Korea

September 18 to 21, 1989

*Write to:* SHK International Services Ltd., 22/F,  
151 Gloucester Road, Hong Kong.

### **United States**

#### **Licensing Executives Society U.S.A./Canada Annual Meeting**

Hyatt Regency Maui

Maui, Hawaii

October 15 to 19, 1989

*Write to:* J. Stuart Ott, 1444 W. 10th Street,  
Cleveland, Ohio, OH 44113, U.S.A.;  
Tel: (216) 241-3940.



# Regional Offices

## NEWFOUNDLAND

Parsons Building  
90 O'Leary Avenue  
P.O. Box 8950  
ST. JOHN'S, Newfoundland  
A1B 3R9  
Tel: (709) 772-4053

### *Local Offices*

#### **Corner Brook**

Tel: (709) 637-4477

#### **Happy Valley**

#### **Goose Bay, Labrador**

Tel: (709) 896-2741

#### **Atlantic Canada Opportunities Agency**

Toll-free 1-800-563-5767

## PRINCE EDWARD ISLAND

Confederation Court Mall  
Suite 400

134 Kent Street

P.O. Box 1115

CHARLOTTETOWN

Prince Edward Island

C1A 7M8

Tel: (902) 566-7400

#### **Atlantic Canada Opportunites Agency**

Toll-free: 1-800-565-0228

## NOVA SCOTIA

1496 Lower Water Street

P.O. Box 940, Station M

HALIFAX, Nova Scotia

Tel: (902) 426-2018

#### **Atlantic Canada Opportunities Agency**

Toll-free: 1-800-565-1228

## NEW BRUNSWICK

770 Main Street

P.O. Box 1210

MONCTON, New Brunswick

E1C 8P9

Tel: (506) 875-6400

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#### **Bathurst**

Tel: (506) 548-7420

#### **Fredericton**

Tel: (506) 452-3124

#### **Grand Falls**

Tel: (506) 473-5556

#### **Atlantic Canada Opportunities Agency**

Toll-free 1-800-561-4030

## QUEBEC

Tour de la Bourse

Suite 3800

800 Victoria Place

P.O. Box 247

MONTREAL, Quebec

H4Z 1E8

Tel: (514) 283-8185

### *Local Offices*

#### **Alma**

Tel: (418) 668-3084

#### **Drummondville**

Tel: (819) 478-4664

#### **Québec**

Tel: (418) 648-4826

#### **Rimouski**

Tel: (418) 722-3282

#### **Sept-Îles**

Tel: (418) 968-3426

#### **Sherbrooke**

Tel: (819) 565-4713

#### **Trois-Rivières**

Tel: (819) 374-5544

#### **Val-d'Or**

Tel: (819) 825-5260

## ONTARIO

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4th Floor

1 Front Street West

TORONTO, Ontario

M5J 1A4

Tel: (416) 973-5000

### *Local Offices*

#### **London**

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#### **Ottawa**

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#### **Sault Ste. Marie**

Tel: (705) 942-1327

#### **Sudbury**

Tel: (705) 675-0711

#### **Thunder Bay**

Tel: (807) 623-4436

## MANITOBA

330 Portage Avenue

Room 608

P.O. Box 981

WINNIPEG, Manitoba

R3C 2V2

Tel: (204) 983-4090

### *Local Office*

#### **Thompson**

Tel: (204) 778-4486

## SASKATCHEWAN

105 - 21st Street East

6th Floor

SASKATOON, Saskatchewan

S7K 0B3

Tel: (306) 975-4400

### *Local Office*

#### **Regina**

Tel: (306) 780-6108

## ALBERTA

Cornerpoint Building

Suite 505

10179 - 105th Street

EDMONTON, Alberta

T5J 3S3

Tel: (403) 495-4782

### *Local Office*

#### **Calgary**

Tel: (403) 292-4575

## BRITISH COLUMBIA

900 - 650 West Georgia Street

P.O. Box 11610

VANCOUVER, British Columbia

V6B 5H8

Tel: (604) 666-0434

### *Local Office*

#### **Prince George**

Tel: (604) 561-5158

## YUKON

108 Lambert Street

Suite 301

WHITEHORSE, Yukon

Y1A 1Z2

Tel: (403) 668-4655

## NORTHWEST TERRITORIES

Precambrian Building

P.O. Bag 6100

YELLOWKNIFE, Northwest Territories

X1A 1C0

Tel: (403) 920-8568

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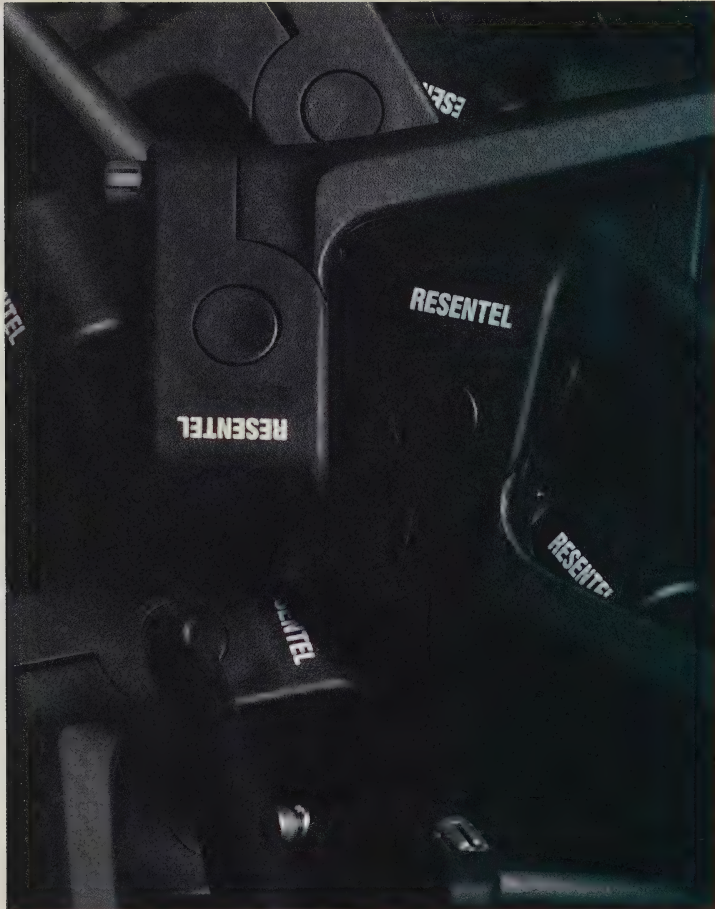
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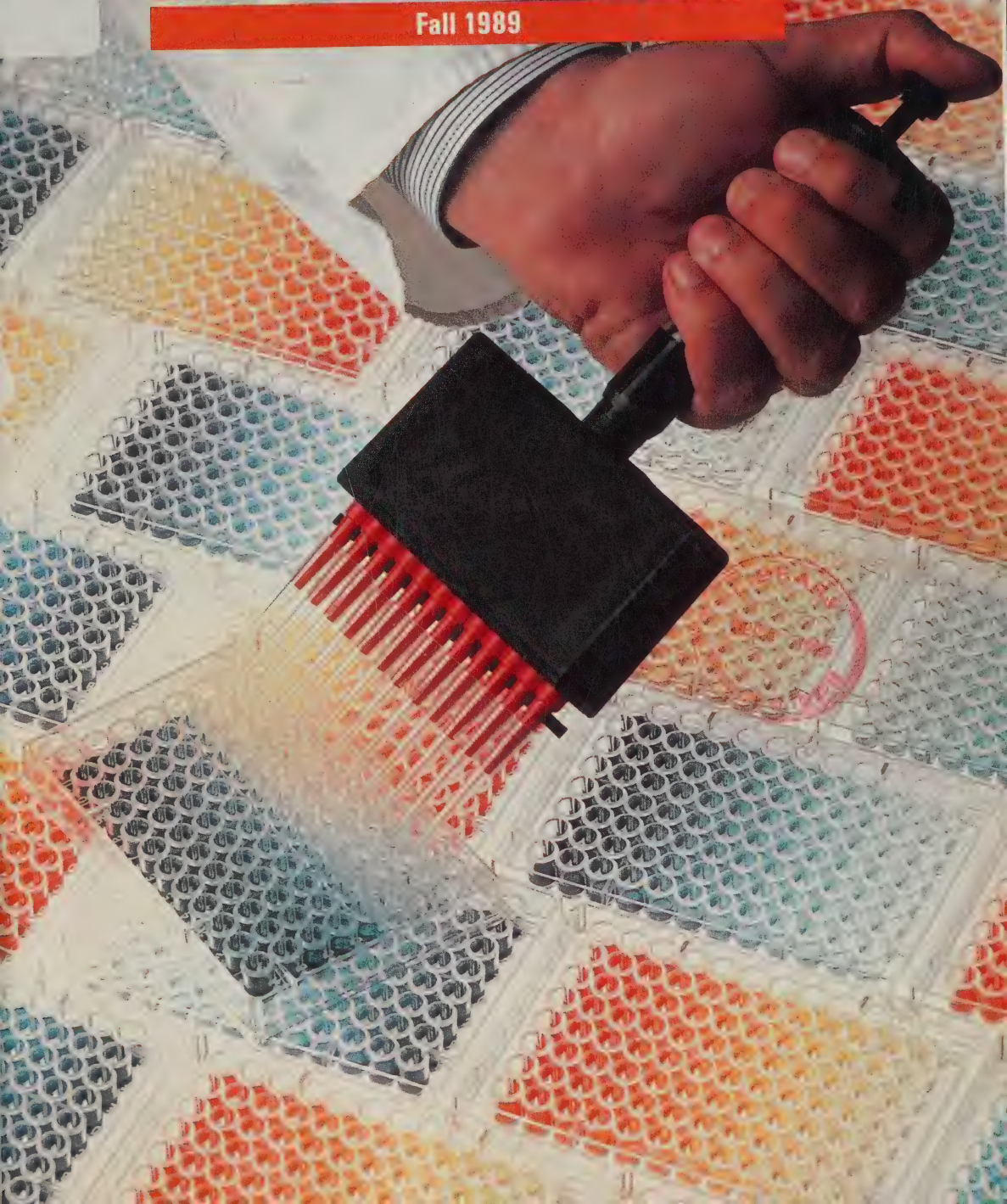
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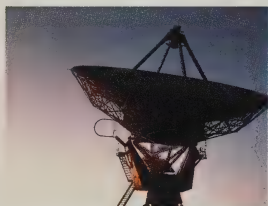
# INNOVATION

Fall 1989



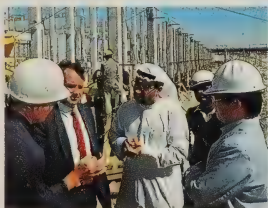


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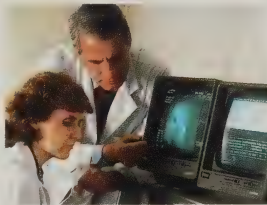
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Masterfile  
Front cover and back  
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## INNOVATION

This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

INNOVATION, Technology Transfer Service (JOIL), Technology Liaison Directorate, Industry, Science and Technology Canada, 235 Queen Street, Ottawa, Ontario K1A 0H5  
Tel: (613) 954-3458.

(Également publié en français)

Hon. Harvie Andre  
Minister, Industry, Science  
and Technology Canada

Hon. William C. Winegard  
Minister of State (Science  
and Technology)

Hon. Tom Hockin  
Minister of State (Small Businesses  
and Tourism)



In this issue of *Innovation*, among other things, we highlight two of a growing list of innovation centres to be found across the country. Innovation, training and the diffusion of technology are major concerns of these centres which are sponsored by Industry, Science and Technology Canada (ISTC).

The work of Montréal's International Centre for Research and Training in Major Projects Management opens up to Canadian company members a world of large-scale projects in Canada and around the world. It concentrates largely on international exchange programs that help promote Canadian technological expertise, and includes conferences on important current issues such as free trade, interest rates, labour availability and strategic planning of large projects at home and abroad.

The Canadian Industrial Innovation Centre/Waterloo in Waterloo, Ontario, was established to help Canadian entrepreneurs, innovators and inventors move their products past the idea stage to the marketplace. The centre's mission is to identify good ideas, products or business plans at an early stage and help them become commercial realities.

ISTC's own contributions to the advancement of technology in the Canadian economy appear in an article describing four of the department's programs — Microelectronics and Systems Development Program (MSDP); Advanced Manufacturing Technology Application Program (AMTAP); Environmental Technology Development Program; and Service Industries Studies Program.

Examples of innovative Canadians are featured in articles on three companies which have successfully developed and marketed new products.

NORAC PRODUCTS INC., of Edmonton, Alberta, produces high-quality specialty ingredients for the food and beverage industries.

OCEAN OPTICAL LTD., of Moncton, New Brunswick, has designed and developed advanced manufacturing systems for the ophthalmic industry, including an automated digital eyeglass frame measurement and lens cutting device.

And, of course, our regular features remain, including the Technology Transfers List, Special Events and R&D Notes — that's that for this edition!

# ISTC PROGRAMS SUPPORT NEW TECHNOLOGIES

Supporting the development and application of new technologies and providing vital business information are among the most important responsibilities of Industry, Science and Technology Canada (ISTC).

**The following four programs are among those the department is offering to meet these objectives:**

- the Microelectronics and Systems Development Program (MSDP);
- the Advanced Manufacturing Technology Application Program (AMTAP);
- the Service Industries Studies Program; and
- the St. Lawrence River Environmental Technology Development Program (ETDP).

## **Microelectronics and Systems Development Program**

The Microelectronics and Systems Development Program (MSDP) is part of a new generation of ISTC programs that emphasize the development and application of new technologies to enhance the international competitiveness of Canadian industry. Proposed projects are assessed not only in terms of technological innovation and risk but also on market potential in Canada and abroad.

MSDP provides Canadian companies with financial assistance for the development of innovative microelectronics and information technology systems.

The microelectronics element of the program supports the development of components such as optoelectronic devices, integrated circuits and microwave devices for use in advanced systems and subsystems.

Systems development projects funded by the program are based on or incorporate advanced microelectronics and information technologies that are applied in manufacturing, processing or service industries. Two examples would be computer-integrated manufacturing systems or process control systems.

The program covers 50 percent of eligible research costs up to a maximum of \$5 million. Full repayment is required for contributions over \$500 000. Eligible costs must be directly related to the project and may include salaries for technical personnel, materials, equipment, subcontracting, prototypes, testing, travel, communication, patents and copyright expenses.

As one of the first recipients of MSDP funds, Vancouver's Glenayre Electronics Ltd. provides an excellent example of the kind of project the program is funding. Glenayre designs and manufactures mobile communications systems, which constitute the fastest growing sector in a highly competitive global telecommunications market.

This market currently emphasizes systems that carry data as well as voice communications. With the help of MSDP, Glenayre is developing such a system for MacMillan Bloedel to enhance that company's forest products operations.

The system will relay detailed data on operations in widespread and remote locations over existing mobile radio systems. It will provide MacMillan Bloedel with immediate access to up-to-the-minute information on all aspects of its operations. In today's markets, instant access to such information is often the key to shorter response time, enhanced productivity and, ultimately, competitiveness.

According to Michael Hodson, Glenayre's vice-president, engineering, Canadian telecommunications firms will not survive in world markets unless they focus on integrated voice and data telecommunications systems as well as products. Mr. Hodson also acknowledged the important role of MSDP in helping companies absorb some of the risks associated with developing these systems.



**The following companies and their projects are also among those supported by MSDP:**

AISI Research Corporation of Vancouver, British Columbia, has developed a low-cost silicon chip that permits the linking of electronic devices in so-called smart homes as well as industrial settings.

Measurix Inc. of Longueuil, Quebec, is developing a computer-integrated manufacturing (CIM) system for a newsprint mill that uses sensors and a communications network to link up and improve the efficiency of all operations.

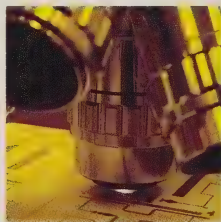
Newbridge Networks Corporation of Kanata, Ontario, is working on an advanced primary rate multiplexer and associated network manager, which greatly expands the capacity of voice and data communications networks.

For more information on the program, contact the MSDP co-ordinator in the ISTC office in your region. A list of these regional offices appears on the inside back cover of this magazine.

### **Advanced Manufacturing Technology Application Program**

The last three or four years have seen a rapid advance in the use of advanced manufacturing technologies by industry. Global leaders in manufacturing are no longer incorporating robots or computer numerically controlled machine tools as islands of automation. Instead, they are realizing substantial benefits by integrating all of their operations. Computer-integrated manufacturing, just-in-time production control, group technology, flexible manufacturing cells and total quality control have moved out of the lab and into the field.

A Canadian Manufacturers' Association (CMA) position paper on advanced manufacturing technologies, entitled *Canadian Manufacturing at the Crossroads*, makes it quite clear that these investments pay off. "Substantial benefits can be derived from . . . the wide range of technologies which are now radically altering the nature of manufacturing. This is borne out by the impressive gains made by companies which are now using them."





While the opportunities are readily apparent, many Canadian manufacturers are not responding. Here's an example of just how much catching up we have to do. A 1987 report of the Economic Council of Canada indicated that only about four percent of machine tools in Canadian factories are numerically controlled, compared to eight percent in Britain, 12 percent in the United States and almost 40 percent in Japan.

Half of the manufacturers surveyed in 1987 by Statistics Canada reported that they did not use any of five manufacturing technologies identified as advanced. The fact that these companies accounted for only about 20 percent of shipments bears out other evidence that small and medium-sized firms are lagging behind in the adoption of these technologies.

The options for a manufacturer looking to streamline or enhance operations with advanced manufacturing technologies can be overwhelming. Small and medium-sized companies may find it particularly difficult to evaluate their potential effectively. Without a thorough analysis of a company's particular needs and of the technology options, money spent on new technologies may be wasted.

That's why Industry, Science and Technology Canada (ISTC) developed the Advanced Manufacturing Technology Application Program (AMTAP) — to help small and medium-sized companies make informed decisions. Under this program, ISTC shares the cost of outside consultants who assess the technical and economic feasibility of upgrading manufacturing processes.

The Canadian Manufacturing Advanced Technology Exchange (CAN-MATE), a joint venture between the Government of Canada and the CMA, is also involved in helping manufacturers apply advanced technologies. Its executive director, Sandon Cox, regards the design of AMTAP as a "brilliant creative act". He points out that the use of these advanced manufacturing technologies is often restricted to very large companies with vast internal resources.

"AMTAP is one of the best programs the government has come up with because it specifically addresses the small and medium-sized businesses," he said.

Under the program, consultants evaluate current operations with a view to long-term strategy, identify areas that need improvement, analyze costs and benefits, and prepare an implementation plan. The implementation itself is not funded by AMTAP.

Experience has shown that the involvement of senior management is a key element in the success of projects that involve substantial changes within an organization. Therefore, one eligibility criterion for AMTAP is that a senior executive sponsor the project and be actively involved with the consultant as the work progresses.

Other criteria include the viability of the company or companies involved, the consultant's capability and experience in the technology being considered, and the extent to which the growth and international competitiveness of the company will be improved.

AMTAP, which was launched last April, is scheduled to run for four years with a budget of \$8.5 million. For individual firms, it covers up to 75 percent of the cost of consultants up to a maximum of \$25 000. If a joint application is approved, each firm may receive up to \$20 000 with a limit of \$200 000 per application.

ISTC staff, knowledgeable in advanced manufacturing methods, are available to help interested firms choose a suitable consultant, make contact with potential partners and plan the implementation of advanced manufacturing technologies.

For more information, contact the AMTAP co-ordinator in the nearest ISTC Regional Office. You will find a list of Regional Offices on the inside back cover of this magazine.

### Service Industries Studies Program

The importance of service industries to the Canadian economy is now indisputable. In 1987, they were responsible for 70 percent of output and employed over nine million people in Canada. We owe nine out of every 10 jobs created in the last decade to the service sector. It is clearly the fastest growing sector of the Canadian economy.

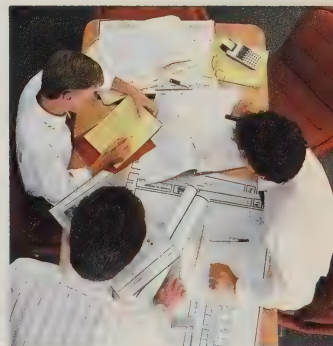
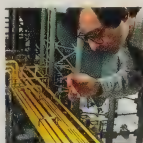
The term "service industries" refers to industries that are not primarily engaged in the production of goods. It includes financial services, telecommunications, consulting, transportation, health care, education, retailing and wholesaling.

Despite the importance of service industries to the economy and the daily lives of Canadians, their growth, structure and role in the economy were not understood. In 1986, the federal government addressed this situation by launching the Service Industries Studies Program (SISP), a \$2.4-million project that examined the structure and dynamics of the service sector and its component industries.

The program, which was sponsored by ISTC, involved over 80 individual studies that can be grouped into three major streams. The Fraser Institute studied service sector growth in the Canadian economy; the Institute for Research on Public Policy examined Canada's international trade in services and regional development and services; and Statistics Canada assessed data on service industries to determine needs and potential for improvement.

Here are a couple of examples of myths about the service sector that were exploded by the studies — service industries provide only low-paying, low-skill jobs; and their growth represents the de-industrialization of Canada.

On the contrary, service industries create many highly specialized jobs in such fields as management, informatics, finance and communications. These types of services have a profound effect on competitiveness in all other economic sectors. Rather than representing the de-industrialization of Canada, service sector growth has been a fundamental and positive factor in our industrial development.





## St. Lawrence River Environmental Technology Development Program

There is a certain irony in the fact that the St. Lawrence River, which has truly been a spawning ground for industrial development in Quebec, is facing a serious industrial pollution problem. Studies of this once-magnificent aquatic ecosystem show a direct relationship between the discharge of pollutants from industrial plants and environmental damage.

ISTC's St. Lawrence River Environmental Technology Development Program (ETDP) is a \$20 million component of a five-year, \$110 million federal action plan to clean up the problem. It helps companies operating in Canada to develop innovative technologies to reduce water pollution from industrial sources.

To be eligible, projects must have commercial potential for the St. Lawrence as well as other Canadian or foreign waters. Technologies may involve modifying manufacturing processes to reduce or eliminate effluents, recycling wastes or treating contaminated water.

Here are just a few examples of the kinds of technologies that are being developed to reduce industrial water pollution: semi-permeable membranes for eliminating trace-level toxins, bacterial agents for eliminating forest and mineral waste, and software for monitoring and evaluating contamination levels.

In addition to saving a river, the ETDP will help to build an industry. For example, demand for water treatment equipment in Canada is expected to grow from the current level of \$400 million a year to \$600 million a year by 1992.

The program covers up to 50 percent of eligible costs to a maximum of \$2 million per project. While individual firms may apply, consortia and other types of co-operative arrangements among companies and non-profit organizations are encouraged.

The federal government's St. Lawrence River Action Plan is intended to complement the Quebec government's efforts to reduce pollution from municipal and agricultural sources.

A Canada-Quebec harmonization agreement on the clean-up effort was signed on June 8 of this year. The lead responsibility for the federal plan rests with Environment Canada, which has established the Centre St. Laurent in Montréal to co-ordinate the project.

**The federal action plan also includes the following components:** the protection of endangered species and sensitive areas; the identification of sources and pathways of pollution and the application of "polluter-pays" compliance schedules; the clean-up of federal facilities and wetlands; and other cost-sharing environmental technology development and application programs.

For more information, such as a list of the studies and a synopsis of each one, please contact:  
Director  
**Commercial Service Industries Directorate**  
*Service Industries and Consumer Goods Branch*  
Industry, Science and Technology Canada  
235 Queen Street  
Ottawa, Ontario  
K1A 0H5  
Tel: (613) 954-2994  
FAX: (613) 954-3107

For more information on the St. Lawrence River Environmental Technology Development Program, contact:  
**National Co-ordination Office Environmental Technology Development Program**  
*Environmental Industries and Projects*  
GSTM  
Industry, Science and Technology Canada  
235 Queen Street  
Ottawa, Ontario  
K1A 0H5  
Tel: (613) 954-3225

For more general information on the St. Lawrence River Action Plan, contact:  
**Le Centre Saint-Laurent Environment Canada**  
*Conservation and Protection*  
Room 400, 105 McGill Street  
Montréal, Quebec  
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Tel: (514) 283-7000



# Major Projects Management

# International Centre for Research and Training in Major Projects Management

**F**ounded in Montréal in 1984, the International Centre for Research and Training in Major Projects Management (International Centre GP) reaches beyond its regional origins to promote Canadian expertise on the international scene. More than just a training centre or professional association, the Centre is a veritable global cross-roads drawing together important developers, academics, business people and government officials. By becoming a member, these individuals acquire a passport of sorts, which opens up to them the fascinating world of large-scale projects in Canada and around the world.

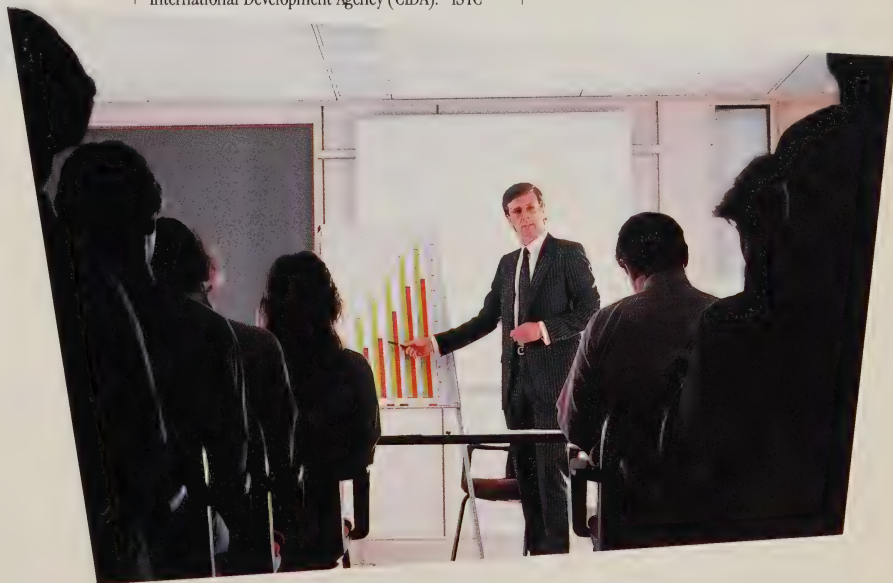
Some 100 well-known organizations, comprising business, public corporations and universities, are already involved in the Centre. Its main activities include international exchange programs which help promote Canadian technological expertise, and conferences on important current issues such as free trade, interest rates, labour availability, and strategic planning of large projects, at home or abroad.

"The International Centre GP is a development tool for business," explains director general Pierre Gaudreau, an engineer and owner of P.R. Gaudreau Inc. "We would not have so many people involved if we couldn't offer tangible benefits for business, as well as for the overall national interest. Our members send top level staff to the Centre because we share the same goals, whether members are in the business or public sector."

Mr. Gaudreau salutes the financial contribution of the federal government through Industry, Science and Technology Canada (ISTC), and the Canadian International Development Agency (CIDA). "ISTC

contributed a grant of \$1.4 million over five years under the Technology Outreach Program (TOP). The program's aim is to improve the productivity and competitiveness of Canadian industry by fostering the creation of technology centres such as ours. For its part, CIDA provided a grant of \$500 000 in 1988 under its Industrial Co-operation Program. This financial support package of \$1.9 million has enabled us to take our rightful place on the national and international scene."

Mr. Gaudreau says this financial assistance signals official recognition of the important role of organizations such as the Centre. "If we have received government assistance," he explains, "it's because we are responding to an obvious need. The International Centre GP is a generator of synergy and excellence open to all interested participants. It contributes not only to the quality of projects undertaken here, but to the international prestige of our experts."



While its primary mission is to serve its members, the Centre performs a duty to humanity as a whole. From the four corners of the Earth it gathers fresh information on major business opportunities and then invites colleagues from around the world to participate and share information in workshops and training sessions.

The International Centre GP has three immediate goals:

- establish and maintain a data bank on projects in progress or under development;
- provide training and advanced learning through general interest conferences and training sessions. These sessions are offered equally to foreign and Canadian senior executives;
- offer an exclusive meeting place for members.

"In collaboration with Industry, Science and Technology Canada, we have set up a strategic information clearing house," Mr. Gaudreau says. "It allows us to take advantage of first-hand information on the development of important projects of all types. Our information is not just releases from the World Bank or other similar agencies, but also includes critical information gathered by the global network of Canadian diplomatic missions."

The Strategic Information Centre will be linked to the National Research Council database, allowing members access to useful technical information. It collects, analyzes and disseminates information on:

- foreign markets;
- major projects in preparation which will soon be open to offers;
- major projects at the finishing or finished state;
- techniques used in project management;
- state-of-the-art technologies used in the creation of major projects;
- specialized programs to control costs and monitor projects.

Mr. Gaudreau is also enthusiastic about members' participation in training programs. "We are at the point of achieving a first which will assure our companies and the Centre a valued place on the international scene. We have set up an exchange and advanced learning program for foreign executives. The visitors are taken on technical visits and training sessions all across Canada over a period of several weeks. These guests are recommended to us by members of the International Centre GP."

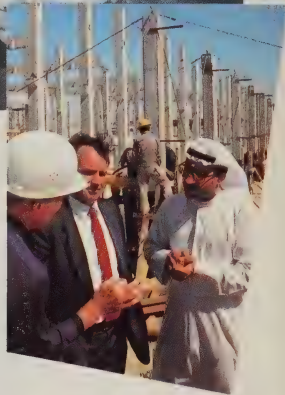


"With the financial assistance of CIDA, the Centre pays for necessary expenses of visitors from developing countries. Candidates not in this category, as determined by CIDA, cover their own expenses or submit them to the Canadian company that recommended them. Following the sessions, guests receive the title of official member of the International Centre GP."

The Centre is preparing other courses designed to improve relations between Canadian experts and their international counterparts. The program Understanding International Realities, for example, was created for Canadian businesses interested in taking part in major foreign projects.

The program deals with the following topics:

- how different nations handle various aspects of major projects, such as: call for tenders, co-venturing, forming consortia, including legal, fiscal and financial aspects;
- financing, the rules that govern it and the various criteria applied to finance practices, with emphasis on world development priorities;
- awareness of real life experience in the diverse regions of the world: politics, economics, social and cultural perspectives, management customs and practices, availability of human resources.







Program content will be kept up to date and adapted to the nature of a business and level of management.

Mr. Gaudreau adds: "This program is currently under review and we are hoping to get the Quebec government involved. The first session will likely be held in February 1990."

Acting on its mission to be a global crossroad, the Centre also organizes conferences and other activities throughout the year. These gatherings are valuable opportunities for representatives of small, medium and large enterprises. "At these sessions," Mr. Gaudreau explains, "there's an exchange of expertise which benefits each member in their own way."

Finally, the Centre enhances co-operation between the business and academic communities.

Its numerous committees bring together volunteer members interested in particular aspects of major projects. These occasions foster exchanges between specialists in various fields with a resulting enrichment in expertise. The committees are constantly planning new endeavours to increase the range and visibility of the Centre.

Jean-Guy Desforges, PhD, a professor at École des Hautes Études commerciales in Montréal, says he's impressed by the creative energy generated by the International Centre GP. "As a professor," he says, "I am interested particularly in administrative structures and the management of large projects. The creation of the International Centre GP is a boost for sustained efforts to enhance research in this area. It is gratifying to be able to apply principles we've developed to the management of large projects."

The idea to create the International Centre for Research and Training in Major Projects Management came from a working group organized in 1984 by the Montréal Chamber of Commerce. Mr. Desforges recalls the formative stages. "The group wanted to create a rapport between groups interested in the management of large projects in Montréal, itself an important city in the field of international project management. I was involved in the definition of the main priorities and mission of the International Centre GP, as we know it today."

The most rewarding aspect, according to Mr. Desforges, is the exchange between academics and practitioners from diverse fields. "When we observe the success of the various conferences and seminars, as well as the interest in the documentation centre," he explains, "we see the role of the Centre reinforced, as a network of information for all those involved in the management of major projects, especially on the international level."

"This network is growing and becoming increasingly influential. The international aspect of our efforts is developing a greater profile, with the exchange program stimulating discussion of questions of global interest. All this creates greater visibility for Canada as an advancement centre for major project management resources."

These glowing assessments are echoed by Raymond Leroux, vice-president of Lavalin International, the Montréal-based consulting giant. With his international focus, Mr. Leroux is particularly interested in western European markets as well as French Africa.

"Our corporate vice-president, Armand Couture, was among the founders of the International Centre GP," Mr. Leroux recalls. "Personally, I have been involved since the first exchange seminars with foreign executives. It's an excellent way to get together — to invite outsiders to come see how we do things in North America, especially in Quebec. It's an effective way to get an edge on the Europeans, who are our principal competition in foreign markets. We look forward to more sessions where we hope to invite foreign colleagues with whom we would like to deal in the future."

Judging by the comments of members, the International Centre for Research and Training in Major Projects Management will be a major force in the coming years. Already, it has outgrown its local scope as witnessed by its activities with a global focus and its membership coming from around the world. For businesses looking to the future, the Centre is truly a passport to the world of major projects in engineering and construction.

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 FAX: (514) 848-9992



Scott Smith, president of Proshred Security, stands beside the van that contains the mobile shredding equipment his company developed with help from the Waterloo Industrial Innovation Centre.

## The Canadian Industrial Innovation Centre/Waterloo

**T**he success of Canadian companies operating within Canada during the next decade will depend largely on their ability to develop new products and innovations. Many of the ideas for these will come from individuals and entrepreneurs in small and medium-sized organizations. For many, the path from the idea to the marketplace can be difficult. However, an organization exists to help make this journey easier — the Canadian Industrial Innovation Centre/Waterloo (CIIC/W).

The CIIC/W was established in 1981 as an independent, non-profit corporation associated with the University of Waterloo. CIIC/W is one of many non-profit organizations funded by the Technology Outreach Program (TOP) of Industry, Science and Technology Canada (ISTC). For up to five years, the program supports the development and diffusion of technology and critical skills training through the funding of specific start-up and operating costs. Additional funding for non-recoverable services costs may also be available after this five-year period.

The CIIC/W includes a staff of 10 professionals and provides a wide range of services to Canadian innovators across the country. These services are aimed at individuals and companies with new ideas who need help in commercializing their inventions and innovations.

They include:

- assessing technical strength;
- conducting market research;
- evaluating commercial potential;
- managing development and testing;
- assisting in venture planning;
- providing training.

The Innovation Centre's mission, says Gordon Cummer, CIIC/W's chief executive officer, is to identify, at an early stage, good ideas, products or business plans and help make them commercial realities. The Centre's services, he says, are primarily educational and are based on the experience of the Centre and its advisors and consultants.

"One of the common characteristics of inventors," says Mr. Cummer, "is their lack of understanding of the marketplace and why their product could be successful. Learning about market needs usually comes with experience in the marketplace and many of these individuals haven't had the opportunity to gain this experience."

"Inventors are often driven by an idea," he adds, "rather than a market need. Most come from technology backgrounds and so they often need help with the business and marketing aspects of their invention."

Not all inventions are successful, Mr. Cummer points out. As part of its education service, the Centre tries to make people aware of potential problems they may encounter and to enable them to manage better the risks involved in bringing their ideas to market. "We try to minimize the cost of failure, which is just as important as helping people be successful. Many issues, such as marketing, financing and proper planning have to be addressed. Most people can deal with them once they are recognized."

According to Gordon Cummer, people who come to the Centre for help have a wide variety of backgrounds. "We evaluate all kinds of ideas. We don't regard any invention as not worth considering. Anybody who has an idea that they feel could be successful should contact us. It may turn out that we won't be able to help much but we can provide initial guidance that won't cost the inventor anything."

Bill Haras, president of Shoreguard Inc. of Guelph, Ontario, is one inventor who has worked closely with the Innovation Centre. Mr. Haras, who developed WAVEBLOCK™, a modularized, steel-reinforced concrete structure designed to minimize shoreline erosion, has used several of the Centre's services to bring his product to the marketplace.



Initially, he worked with Centre staff to develop a brochure for potential customers, such as municipal governments, conservation authorities and private shoreline owners.

He then contracted the Centre to conduct laboratory and field testing on ice-loading and other physical properties of WAVEBLOCK™. "The Centre put me in touch with the proper people quickly. They also provided the objective expertise I needed. We're now working together to develop marketing strategies and identify potential customers."

Another recent success story is that of Toronto company, Proshred Security. The company, which had sales in fiscal year 1988 of \$2.3 million, traces its beginnings to the early 1980s when company president, Scott Smith, recognized the need for a mobile shredding service to provide confidential destruction of corporate records and files. To meet this need, Mr. Smith developed a unique mobile shredder.

His next step, in 1984, was to ask the Innovation Centre to evaluate his invention and advise him on costs and engineering. He was happy with the results. Innovation Centre staff were easy to approach, he says, and the evaluation produced several technical recommendations to make the product better. "Because the evaluation was positive, it gave me encouragement to continue. It also provided me with an objective assessment to show to potential investors."

In addition to helping inventors such as Mr. Haras and Mr. Smith, the CIIC/W offers assistance to small and medium-sized companies. "The future of these companies will depend on their ability to innovate and develop sound business and marketing plans," says CIIC/W Chief Executive Officer Cummer. The Centre has developed models that help companies learn more about business strategies and innovation. "Our major aim is to help companies develop new ideas and innovations in product development or marketing. Our interest is in looking at existing resources and showing organizations how to be more innovative."

The CIIC/W offers many programs to assist inventors, entrepreneurs and companies:

*The Inventor's Assistance Program* provides inventors with a low-cost, professional and confidential evaluation of the strengths and weaknesses of their inventions. These can vary from simple household products to advanced scanning sonar systems. The Centre may also conduct a more detailed follow-up analysis, called *The Preliminary Market Evaluation*, which may include preliminary market research, confidential reviews by outside evaluators and a search of related technology at the Canadian Patent Office. After the evaluation process is completed, the Centre may further assist some inventors to bring favourably rated inventions to the market.

*The Enterprise Planning System* provides assistance to entrepreneurs and potential entrepreneurs in several ways. The system gives an objective assessment of an individual's strengths and weaknesses as an entrepreneur. It also helps individuals determine whether a business opportunity really exists and assists in preparing a strategic business plan to turn an idea into a viable business venture.

*Contracted Design and Development* — The Centre helps companies locate and arrange applied research and product testing, construct prototypes, analyze development problems and recommend design solutions.



Waterloo Centre staff members study new Canadian invention.

*Industrial Market Research* — The Centre's Marketing Services group provides market research services to a variety of organizations ranging from small regional companies to large multinational corporations. This research activity can focus on market size, potential market changes, competitive analysis and assessments of clients' current marketing strategies.

The Centre also provides education programs, for both the private and corporate innovator, which include a wide variety of workshops, seminars and training programs. Topics include market research, managing a new enterprise, advertising and public relations, identifying customers and legal rights and safeguards.

In 1987/88, the Centre initiated an *Affiliated Organizations Program* to involve organizations across the country in its *Inventor's Assistance Program*. A national communications network now enables inventors to gain access to the *Inventor's Assistance Program* at local levels and receive counselling and training by organizations which foster innovation within their communities. Members of the national network include the Saskatchewan Research Council, the University of Ottawa and the University of Manitoba.

"The *Affiliated Organizations Program* allows local organizations to work with us and to work locally with the inventor," says Gordon Cummer.

"They may help the inventor prepare specific information relating to the proposal before it is evaluated." The most important role of the local office will be to advise and assist an inventor after a positive evaluation. "Because they are closer to the individual, local organizations can provide valuable advice quickly and help to make a project a commercial success," he adds.

The Innovation Centre covers its costs by charging fees for most of the services provided. All material, data and information pertaining to each client is held in confidence.

For more information on the Centre, contact:  
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## NORAC Products Inc. — A Natural Success Story

In these days, when health-conscious consumers are searching for healthy food substances without chemical additives, a dynamic young Edmonton-based company, NORAC Products Inc., is proving to be a trail-blazer.

### How Did It All Get Started?

NORAC Technologies originally started up its research operations in Edmonton, Alberta, to work in the heavy oil and hydrocarbon industries. This was hardly surprising. After all, two of its founding members, Dr. Fritz Boehm and Richard Caron, came to NORAC Technologies after extensive experience in the oil and gas industry.

Dr. Boehm's credentials included a stint as vice-president of Krupp Industries (Canada) and previous experience as a department head at the Central Coal Research Institute in West Germany. Mr. Caron's background was in the financial industry but he, like Dr. Boehm, had been a co-founder of Canadian Energy, a company operating a heavy-oil upgrading pilot plant. So, the original move from operations to research in oil and gas is no surprise. But, how did two men, whose background was oil and gas, become involved in that trend-setting industry, natural foods?

As Mr. Caron explains it, it was a natural progression. He and his partners came across an exciting new extraction technology while working with a West German affiliate on a hydrocarbon upgrading development plant. This technology, known in the industry as "Super Critical Fluid (SC) extraction", is a process technology mainly used for the extraction of high-grade products. Lights went on. Surely, Mr. Caron thought, this technology should be put to work "on carbohydrates, not hydrocarbons."

With this goal in mind, to work on the extraction technology and develop a full range of "new" and "natural" food ingredients, NORAC Extraction and Product Development was established in Edmonton in 1985.

### What's So Special About the Products?

To begin with, the ingredients produced by the Super Critical Fluid process are all natural. Their characteristics are not changed or damaged in any way by the process technology. This means that they taste and smell much more natural than ingredients produced by conventional steam or solvent extraction, precisely because they are more natural.

Even more crucial in these days when all opinion surveys show that consumers are increasingly nervous about chemical additives in their food, ingredients produced by the NORAC formula are free of potentially harmful chemicals and solvents.

According to Mr. Caron, this technology is already emerging quickly in Europe, and he and his partners saw it as the wave of the future in North America. "The trend to enhanced flavour and natural products will only get stronger."

As companies read consumer preferences and anticipate a world of stricter government regulation in response to consumer demand, he has noticed that many are no longer looking to expand in the traditional technologies. NORAC seized the opportunity to capitalize on what the company saw as a winning formula.

### The Opportunity

Super Critical Fluid extraction has already been put to the test in Europe. However, most European plants are dedicated to single product application, for instance, decaffeinating coffee.

NORAC's intention was to design a multi-purpose plant capable of processing a wide range of raw materials. This would allow for efficiencies of scale. It would also reduce the dangers inherent in being dedicated just to one product, or a narrow product line. NORAC would have the flexibility to respond to changing market needs.

So product development and enhancement would be part of the winning formula. There was, however, another important factor. Although Super Critical Fluid extraction is a leading-edge technology in Europe, it was hardly known in North America. The NORAC Product Development Centre moved fast to establish itself as the North American leader in this new technology.

**NORAC extraction centre in which the Edmonton-based company produces natural food ingredients.**



But this was only the beginning. NORAC's founders now confidently claim that when the new multi-purpose plant comes on stream in the mid-1990s, it will be the largest of its kind in North America. They also expect the construction of this plant to give the company a five- to seven-year lead time in producing distinct and unique products to meet the new marketplace realities of educated consumers and tougher government regulations.

And there is more to come. While the initial NORAC plant will be in Edmonton, the company already has ambitious plans to open up facilities in locations as diverse as California and Malaysia.

The market opportunities, indeed, seem almost endless. The extraction and separation industry, excluding oil and gas, is estimated to have annual revenues of more than \$16 billion, with an annual growth rate of 8 percent! And, as the appetite of consumers for unadulterated ingredients grows, the trend-line seems to be pointing ever upwards.

### What Has Been Achieved So Far?

Any organization's strength is its people. NORAC believes that it has put together a small but highly professional management and research team that has been effective and successful in building up the NORAC Centre and is now poised to move on to the new challenges posed by the establishment of multi-purpose plants.

NORAC's tangible successes are easy to list. Over the last four years, since it was set up in 1985, the NORAC Centre has: successfully designed five product development plants, developed over 70 products, attracted more than 20 collaborating partners and designed its first commercial plant.

These are tangible results. It is likely, however, that when future balance sheets are examined, it will be revealed that NORAC's growth has come from the collaborative associations it has developed and is developing.

Right from the beginning, in its association with West German companies involved in Super Critical Fluid extraction technology, NORAC has used collaborative arrangements as a crucial tool in its advance. These early arrangements allowed NORAC to design, engineer and construct "state-of-the-art" plants.

### Some of the products created by NORAC.

Currently, these associations are among the ways in which NORAC ensures that it maintains its local and international research reputation. Partners include Alberta-based institutions, such as the Government of Alberta, the Alberta Research Council and the University of Alberta, as well as the National Institute of Health in the United States, the University of Erlangen in West Germany and the TNO research facility in the Netherlands, the equivalent of Canada's National Research Council.

In addition, the basis of NORAC's marketing strategy is to work with companies requiring new processing capabilities or products. This has translated into marketing arrangements where NORAC guarantees product supply and joint-venture relationships for a long period of time. These long-term arrangements are crucial to the company's continued success. Although NORAC has had a "jump" on the competition, other companies, including such giants as General Foods, are beginning to move in, although generally into single-purpose applications.

### The Future

NORAC has an ambitious 10-year strategic plan. It intends, of course, to continue its development program on Super Critical Fluid extraction technology. Also, it will be expanding its capabilities into new, complementary separation processes. New applications will be sought in the beverage, cosmetics and pharmaceutical industries. The exciting new field of biotechnology promises a bright future.

There are plans to build and operate four manufacturing facilities to service NORAC's purchasing and marketing contracts. There are also plans to seek new marketing arrangements for other food ingredients.

A few examples: In a joint venture with a British-based food conglomerate, NORAC has agreed to provide a manufacturing facility for aromas, flavours and special food ingredients to serve the European market; NORAC has signed a Letter of Intent with a U.S.-based company to supply NORAC products to their more than 20 branches. This order will initially be filled from the Alberta plant.

NORAC even has an agreement with a large pharmaceutical company based in Southeast Asia and an international European flavour house jointly to construct a manufacturing facility, producing extracts from Southeast Asia and the Pacific Region, a potential growth area for Canadian companies with the business savvy to exploit this growing market.

With a world market that is constantly growing for food ingredients that can meet new consumer demands and increasing government regulations, the prospect, indeed, looks rosy for a company that has proved itself willing to take a chance and invest in the technologies of tomorrow.

For further information, contact:

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## Let "Fingers" Do the Walking — Innovation in the Optical Industry

**C**laude Brunet's aim was to streamline production of eyeglass lenses in his small Moncton-based manufacturing operation, Ocean Optical. The device he came up with is now making a major impact on the whole optical industry.

Trade-named "Fingers", its advent has swept much of the sludge out of the lens-making process. It eliminates steps, improves the final product, improves service to the customer and reduces costs. The industry could hardly ask for more.

Brunet's first company, Ocean Optical, came into being in 1976; what started as a two-person organization has grown to its present complement of 36 employees. Much of the company's success is due to the president's skill in searching out new technology to enhance production and products. Mr. Brunet does not wait around for other people to come up with the answers. He seeks them out himself.

In the manufacture of an ophthalmic lens, one of the most difficult procedures is the correct measurement of the eyeglass frame. The second challenge is to produce a lens whose size and shape fits the frame exactly. Up to now, the combined process has required technicians highly trained in pattern-making and skilled in the use of an "edger" in combination with templates or patterns. Not only do they have to create extremely accurate templates, but also the process requires that each lens be cut two or three times. The final adjustment is made by hand.

**"Fingers", the device that eases the task of matching lenses to eyeglass frames, designed and produced by Moncton-based Ocean Optical.**



This rather laborious approach is time-consuming, labour-intensive and involves a high degree of spoilage. For Claude Brunet, it simply was not good enough. About manual measurement of the frames, he said, "We found that data was not accurate enough. We decided to invent a little mechanical electronic gadget that would measure the frame more accurately. That information then would be sent to the computer."

In his search for the "little mechanical electronic gadget", Claude Brunet ended up designing a new system that has the optical industry buzzing. It effectively eliminates creation, storage and retrieval of physical patterns, hand edging of the lens, and the need for highly trained technicians to carry out the process.

Mr. Brunet originally came up with his idea in 1979 but, at that time, the research and development to bring it into being was too expensive. He parked his scheme for a few years and then presented it to a professional engineer on his staff, Marc Savoie. "I've been dreaming about this for years. Can it be done?" he asked. After going away and working on the idea, Savoie came back with his answer. Yes, absolutely.

Claude Brunet and Marc Savoie approached Cadmi-Micro Electronics Department of the Université de Moncton, a private research and development company funded by the federal and provincial governments and the university. The design was their own; Cadmi provided the electronics and software to make it a reality.

"Fingers" has become the flagship of Mr. Brunet's operation. A combination of hardware and software, the system is desk-top size, measuring about 50 cm (20 in.) wide, 46 cm (18 in.) deep and about 18 cm (seven in.) high. It gets its name from the finger-like mechanism that holds the frame in place while it is being traced.

In a production environment, the tracing unit sends digitized size and shape measurements of the frame to a mechanism on an "edger" which then shapes the lens to match. The "edger" module allows an operator with minimum skills to cut a lens exactly.



Although Mr. Brunet's primary goal had been to solve a practical manufacturing problem for Ocean Optical, the potential for "Fingers" became obvious when he saw how effective it was in improving production methods in his own firm.

He soon realized that "Fingers" had much broader applications. Not only did it reduce spoilage, increase accuracy of lens measurement and reduce labour costs, it provided a direct interface between the vision specialists — dispensing opticians and optometrists — and lens-making establishments that did not exist before.

"Fingers" can be hooked up to a computer (Ocean Optical uses PCs) to collect and transfer data from the vision specialists to the lens-makers. This is how it works as a tool for the dispenser: he or she can trace the eyeglass frame selected by a customer, then enter the prescription data, lens style, lens material, etc., into the computer. A graphic display of the lens is then called up on the screen, to scale, allowing the dispenser to see exactly what the lens will look like.

The dispenser can then determine if there is a lens blank that will accommodate the prescription for the chosen frame. If not, a different frame is selected.

A graphic profile of the lens in different materials can also be pulled up on the screen, showing the thickness and weight of each one. This enables the dispenser to select the right material and advise the customer on proper frame selection. It also eliminates the common occurrence of ordering a prescription that cannot be processed for a particular style of frame.

The optician or optometrist sends all the prescription and frame data to the lens-making laboratory by modem directly from the computer. The lab technicians can then grind and shape the lens to perfect size without ever having to see the actual frames. This is an especially useful feature for those customers who want to keep their old frames and change only the lens. They avoid the delay and inconvenience of having to send the frames off to a lab for measurement.

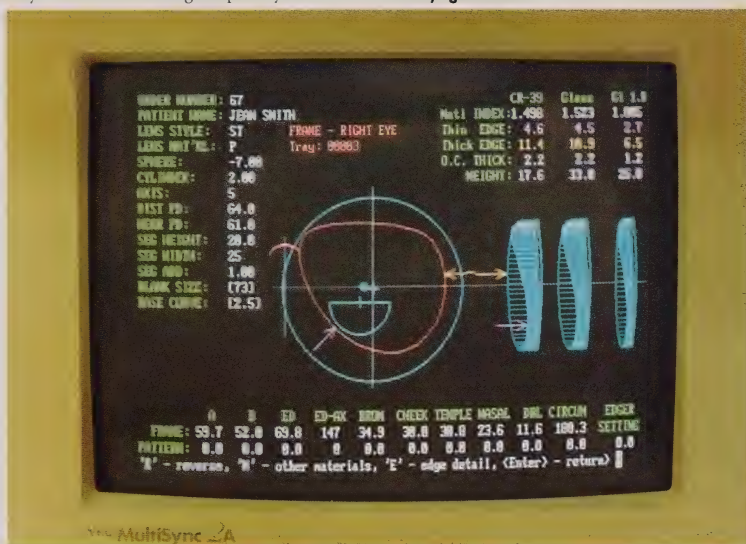
"Fingers" is only the most recent of a number of technological innovations that Claude Brunet has developed in his quest for improved efficiency in lens-manufacturing techniques. His forays into the world of invention led to the establishment of a second company in 1983, called Ocean Software. His innovations have earned both his companies international recognition in the ophthalmic industry.

Mr. Brunet says that he searches and develops new techniques and products to solve practical problems within his own company: but they have spun off into the industry where they have made a big splash. "Selling them is a nice result," he says. But it is not necessarily the original intent. Ocean Software exports 75 percent of its products now to the United States and Great Britain.

"Fingers" was launched at several international trade shows within the last year and a dazzled industry has responded with enthusiasm. The potential market for the product includes both lens manufacturers and technicians in labs and production facilities, as well as the front-line dispensers — the vision specialists — who see the customers, fill lens prescriptions and fit and sell the frames.

Sales networks are in place to handle "Fingers" in Australia and are being set up in Canada, Britain and the United States. A franchise of 300 retail stores in the United States has already told Mr. Brunet that they "want to proceed as quickly as possible" in supplying all their locations with the device. He says that, at \$7500 per unit, "the savings generated by Fingers could make the system pay for itself in as little as six months." Since the unit can be hooked up to any standard IBM-PC for screen graphics display and modem-to-modem communication, it is easy to link it into existing computer systems.

**Computer monitor, used with Ocean Optical's "Fingers", showing details of an eyeglass lens.**



Claude Brunet is excited about his new product: "Fingers" is opening up new markets — both local and international — for his Ocean Optical. The industry is excited about the product too. It is already carving a niche for itself in both production and sales. Vision specialists and lens-makers really can let "Fingers" do the walking for them, saving both time and money.

"Fingers" is the latest innovation from Claude Brunet. It certainly will not be the last: in the optical industry Claude Brunet is a man to keep an eye on.

For further information, contact:  
Ocean Optical Ltd.

P.O. Box 1150  
5 Orange Lane  
Moncton, New Brunswick  
E1C 8P6  
Tel: (506) 857-0220  
FAX: (506) 859-1662  
Telex: 014-2359

# Technology Transfers

## Offered

### Canada

- New Bonded Cellulosic Materials and Chemical Process for Bonding Cartons, Paper, Cloth
- Meat Skinning Machine
- Elevator for Harvesting Delicate Agricultural products
- Variable Depth Sonar Line-Handling System
- Inclusion Complexes of Cyclodextrins by Agglomeration
- Energy-Storing Gypsum Wallboard
- Human Monoclonal Antibodies Reactive with Haemophilus Influenzae Type B
- Quasi-Optical Stripline Devices
- High-Pressure Infrared Spectroscopic Technique for Monitoring Recombinant Protein Production
- Isotopic Fibre Optics
- Process for the Production of Fermentable Sugars from Biomass
- Dual Polarization Microstrip Array Antenna
- Synthetic Potato Skin
- Magnetic Sensor
- Biodegradable Plastic
- Drapery Heat Guard
- NETFLEX Technique for Screen Printing on Plastic Mesh
- Hydrofoils for Microlight Seaplanes
- Contour Hand-Sander

### Australia

- Bicycle Seat

### European Community

- Process for Recycling Waste Plastic
- Ergonomic Typing Keyboard
- Heat Transfer Pump
- Display System with Hexagonal Pixels

### France

- Automatic Card Filing System
- Safety Barrier

### German Democratic Republic (East Germany)

- "Gabatron" — Controlling System for Cooking and Baking
- Technique for the Biological Elimination of Phosphate from Sewage
- Technique for the Re-plasticization of Rubber Powder
- BIOERIT® — New Bioglass Ceramics for Medicine
- Residue-free Extraction of Pectin
- Technique for Manufacturing Low-wear Elastic Sealing Elements
- Coated Titanium Carbide (TiC) Hard Metal for Cutting and Shaping
- Tactile Sensor for Automatic Assembly
- Robot Wrist with Snake-like Mobility
- Narrow-Slit Welding of Thick Metal Sheets
- Alternating Current Aerial Dust Filter
- Plant and Technique for Granulated Drying with Fluidized Bed Technique
- Pneumatic Stepping Motor
- Automatic Device for Bottling Liquid Media of Different Viscosities
- Interference-Optical Way Sensor

### New Zealand

- Water-Operated Turbine

### Switzerland

- Camping Grill Kit

### United States of America

- Hedge Trimmer Extension Device
- Insect and Roach Spray
- Electronic Early Pregnancy Testing Device

# Offered

## Canada

### New Bonded Cellulosic Materials and Chemical Process for Bonding Cartons, Paper, Cloth

A Canadian company is offering to firms in Canada and the United States the patents and know-how, for outright sale or licensing or joint-venture arrangements, of its new bonded cellulosic materials useful for filling and reinforcing thermoplastic polymers. The materials are characterized by low price, low density and durability at low temperatures. The firm also offers a new chemical process for bonding cartons, paper, cloth, etc., with thermoplastic film such as polyethylene.

*For further information, contact:* Dr. Alphons D. Beshay, 3595 de Courval, Trois-Rivières, Quebec G8Z 1S8; Tel: (819) 376-1930.

### Meat Skinning Machine

A Canadian company is offering for outright sale or licensing arrangements its patents for a meat skinning machine designed remove the thin membraneous skin from fresh meat of any kind. The device features an adjustable blade-bearer that can adapt itself to the membraneous skin to be removed. A stainless steel drive roller makes its operation fast and easy.

*For further information, contact:* Gilbert Simon, 475, rue Caroline, Apt. 26, Longueuil, Quebec J4H 3K6.

### **Elevator for Harvesting Delicate Agricultural products** Case #8514

This device is designed to lift, without damage, delicate agricultural products, particularly those with irregular shapes, from the digging bed of a harvester to a height suitable for loading onto a vehicle. It consists of a rotating cylinder with a resilient surface and an endless belt. Products are caught between the surface and the belt, gently lifted to the desired height and released.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Variable Depth Sonar Line-Handling System** Case #8704

This system eliminates lateral deflections of the line or cable between the inboard sheave and the drum, allowing the cable to be taken off along the pivot axis of the boom. Its design accommodates variations in tension in the cable while cutting cable tension at the inboard end.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Inclusion Complexes of Cyclodextrins by Agglomeration** Case #8911

This is a process in which inclusion complexes are formed from guest molecules and cyclodextrins during agglomeration. High shear agitation, in the presence of a small amount of water, produces complexes bonded into strong agglomerates for use in foods, pharmaceuticals or agrochemicals.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Energy-Storing Gypsum Wallboard**

Case #8939

Use of this wallboard in spot locations, such as behind a wood-burning stove or opposite a southern-exposure window, is claimed to provide energy savings for many years.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.* Companies requesting access to the technical report will be asked to sign a confidential disclosure agreement.

### **Human Monoclonal Antibodies Reactive with Haemophilus Influenzae Type B**

Case #9064

These monoclonal antibodies were produced against outer membrane antigens of Haemophilus influenzae type B by heterohybridomas using human tonsillar lymphocytes. They can be used for diagnostic research, therapeutic or prophylactic purposes.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Quasi-Optical Stripline Devices** Case #9072

These devices can be used as short centimetre to sub-millimetre wavelengths antennas or as feeds to reflector antennas. One integrated structure could be designed to replace feed systems normally used in multi-beam reflectors. The device can be integrated with new, low noise superconductor-insulator-superconductor (SIS) mixer junctions or with transistor amplifiers which can be mounted directly on the stripline structure. Also its quasi-optical properties allow lenses and reflectors to be built into the structure to control the shape of beams in satellite relay antennas.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **High-Pressure Infrared Spectroscopic Technique for Monitoring Recombinant Protein Production** Case #9097

This technique is said to be uniquely adapted for use in commercial processes to monitor the production of recombinant proteins (including soluble proteins) without disrupting the biological process. It is based on the discovery that, when measured under pressure, infrared spectra of E. coli strains and transformants producing recombinant proteins show a distinct shifting pattern in specific spectral parameters of transformants.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Isotopic Fibre Optics** Case #9116

The invention is related to an optical fibre in which the core material is an isotope of the cladding material so that light attenuation at the core-cladding interface is minimized. In addition, since light confinement is achieved by the difference in the refractive index between the two isotopes rather than by doping, the fibre would be immune to radiation which can easily damage ordinary fibres.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

### **Process for the Production of Fermentable Sugars from Biomass** Case #9118

This is a process for the production of sugars from wood or other cellulose-containing biomass and consists of several steps including pyrolysis. The resulting sugars can be fermented into alcohol.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*



## **Dual Polarization Microstrip Array Antenna** Case #9269

The antenna array is designed for efficient reception or transmission of electromagnetic waves over a wide range of frequencies and angles of incidence. It is suitable for high-frequency operation for which other antennas and associated circuitry would be more difficult to make and more expensive. Also, its relatively higher power handling capacity makes it suitable for use as a rectenna for power reception.

*For further information, contact:* Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

## **Synthetic Potato Skin**

The shell of this synthetic potato skin is a film composed of natural ingredients, has the physical appearance of a natural potato skin and encloses a filling of mashed potatoes and potato granules. It tastes like natural potato but has additional nutritional and sanitation advantages.

*For further information, contact:*

Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

## **Magnetic Sensor**

This is a CMOS compatible, lateral magnetic field sensor that can convert a magnetic field into an electronic signal. It eliminates idle currents, has superior sensitivity and good linear response to magnetic fields. An application is as a component in such devices as electrical utility meters.

*For further information, contact:*

Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

## **Biodegradable Plastic**

This invention concerns the hyperproduction of a biodegradable, biocompatible, thermoplastic (poly-beta-hydroxybutyrate, pHb) by mutant strains of *Azobacter vinelandi*. Production is economical, using inexpensive, unrefined sugar sources. Potential uses exist in medicine and as a replacement for certain non-biodegradable plastics.

*For further information, contact:*

Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

## **Drapery Heat Guard** Ref. No. 603A

Featuring 100 percent aluminum construction, this heat guard protects draperies, vertical blinds and furniture from excessive heat exposure. The guard is easy to install and has been approved by the Canadian Standards Association (CSA) and fire marshall. Available for licensing along with tooling and equipment.

*For further information, contact:* Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

## **NETFLEX Technique for Screen Printing on Plastic Mesh** Ref. No. 234

This technique was developed in Finland, licensed to a Canadian company and is now available for sub-licensing and complete training in Canada and the United States. It provides for printing a message in one or more colours on one side of thin polyester or nylon net. The message is seen only from one side of the net and does not obstruct vision from the other side. Typical use is for messages on the rear windows of cars or in shop windows.

*For further information, contact:* Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

## **Hydrofoils for Microlight Seaplanes**

Ref. No. 604

This invention is designed to interact with floats, ski-like devices, etc., to separate their buoyant support from planing and then recombine the two functions to provide light and stronger structure with less drag and added lift, reducing the power needed for take-off.

*For further information, contact:* Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

## **Contour Hand-Sander** Ref. No. 335

Shaped like a bow with a handle at one end, this sander is designed to produce convex contours. Cut and stretched across the bow, the sandpaper's tension is adjusted to even out irregularities or to feather into an existing finish.

*For further information, contact:* Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

## **Australia**

### **Bicycle Seat**

An Australian inventor is seeking a Canadian company to manufacture, through licensing arrangement, his revolutionary bicycle seat, anatomically designed to give a more comfortable, safer ride. Statistics show that standard bicycle seats cause discomfort and can cause serious damage, mostly to male riders. This seat is designed with two buttock- or cheek-supporting lobes located so as to give no pressure on sensitive organs. A lip at the rear of each lobe acts as a surface to absorb the backward pressure of the cyclist's pedalling.

*For further information, contact:* Alan Swarbrick, No. 3 Residence "Colanda", P.O. Box 285, Colac, Victoria 3250, Australia.

## **European Community**

### **Process for Recycling Waste Plastic**

Ref. GSSW

A European company offers licence rights to its process for recycling plastics. The process uses most thermoplastics which are sorted prior to granulation and plastification through a patented extruder feeding water-cooled moulds. The resulting products are almost similar in quality to those made from new plastic granulate.

*For further information, contact:* Götz Schaudé, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

## **France**

### **Ergonomic Typing Keyboard** Ref. CLIP

A French scientist offers for licence a new ergonomic keyboard which uses only a third of the keys on a standard keyboard. It is IBM PC compatible and allows a choice between languages and characters (standard, Russian, Greek, Hebrew, scientific, chemical, etc.).

*For further information, contact:* Götz Schaudé, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

### **Heat Transfer Pump** Ref. CALO

Through an arrangement of heat exchangers, vessels, valves and pipes, this heat transfer pump uses the thermal difference between the sources of heat and cold to transport the liquid in a closed system which carries the heat to where it is needed.

*For further information, contact:* Götz Schaudé, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

## **Germany, Federal Republic of (West Germany)**

### **Display System with Hexagonal Pixels**

Ref. GSBR

A German company offers for licence its displays with hexagonal pixels which give visibility three times better than with round or square pixels. All letters and figures, even pictures or Arabic characters, can be displayed.

*For further information, contact:* Götz Schaudé, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

## **France**

### **Automatic Card Filing System**

A French firm is looking for a licensee in Canada to produce and market its CASCADE™ card filing system for vertical planning boards. Based on toothed lateral racks, the open-ended CASCADE™ system places a new card over the card already filling the spot which now automatically drops down a slot, creating a "domino" effect for all the cards in lower slots. This eliminates time-consuming manual repositioning of cards.

*For further information, contact:* R. Valéry, c/o Christian Salaun, ELAN, 13, rue Jean Brunet, 92190 Meudon, France; Tel: 011.33 (1) 46.26.33.80.

### **Safety Barrier**

A French company offers the technology to Canadian firms, on a joint-venture partnership or licensing arrangement, for its Modular Absolute Control Barrier (BAlM). BAlM acts as a regular vehicle barrier under normal conditions and as an anti-terrorist device under attack. Consisting of a gate-like device with "stop" signs, BAlM is connected to from one to three spring-loaded modular metal barriers that rise from a horizontal position if the control, gate-like barrier is improperly lowered. It has been tested to stop motor vehicles weighing as much as 180 tonnes travelling at speeds of up to 52 km/hr (32 mph).

*For further information, contact:* Gérard Mothe, SERTA, C.P. 37, avenue de Bordeaux, Saint-Jean-d'Illac, 33127 Martignan-sur-Jalle, France; Tel: 011.33 (56) 47.81.06; FAX: 011.33 (56) 34.85.81.

## **German Democratic Republic (East Germany)**

### **"Gabatron" - Controlling System for**

**Cooking and Baking** Ref. No. ZLB-111

"Gabatron" is a new method of controlling cooking and baking. A plug-in sensor measures the temporal change of impedance in the objects being cooked or baked — meats or cakes — evaluates it to give the best degree of cooking or baking. The device consists of a probe, which is inserted into the product to be cooked or baked, and an on-line electronic automatic control.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Technique for the Biological Elimination of Phosphate from Sewage** Ref. No. ZLB-112

Bacteria, with an increased capability of absorbing phosphates in sewage sludge, are used in an anaerobic-aerobic process which eliminates up to 70 percent of the phosphates. The process guarantees continuous operation, summer and winter, for low-cost elimination and economic use of the resultant phosphorus.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Technique for the Re-plasticization of Rubber Powder** Ref. No. ZLB-113

Based on a newly developed mechanico-chemical technique, rubber powder, obtained from old material with a grain size up to 1 mm, is devulcanized on the grain surface in a way that will guarantee good miscibility in fresh mixtures and in high concentrations. In addition, a complete co-vulcanization is reached.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

## **BIOVERIT® - New Bioglass Ceramics for Medicine** Ref. No. ZLB-114

As long-term, stable bio-materials for the replacement of hard tissue in medicine, glass ceramics open new avenues of medical advance. Applications include: as dorsal vertebra in orthopaedics; as middle ear implantations in head and neck surgery; as tooth-root implantations and tooth reconstruction in stomatology.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Residue-free Extraction of Pectin**

Ref. No. ZLB-115

A new technology produces residue-free pectin from virtually all pectin-containing vegetable tissues, including those from cells grown in vitro. The technology uses well-known engineering solutions which are, however, unusual in the production of pectin. Exact process control through a new type of analytical system provides excellent adjustability of the process.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Technique for Manufacturing Low-wear Elastic Sealing Elements** Ref. No. ZLB-116

This technique modifies the surface of sealing elements so that significant improvements in friction and wear can be achieved at low cost. It is reported to eliminate the stick-slip phenomenon and increase substantially both wear resistance and resistance to aging.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Coated Titanium Carbide (TiC) Hard Metal for Cutting and Shaping** Ref. No. ZLB-117

This is a new development that improves the cutting and shaping performance of titanium carbide hard metals. A system of layer-coating the TiC hard metal makes it possible to increase the service life of the hard metal during metal cutting of structural, carbon and mass steels.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*



### **Tactile Sensor for Automatic Assembly**

Ref. No. ZLB-118

This tactile sensor provides reliable surveillance to help ensure safe automatic assembly operations which use industrial robots and flexible automatic assembly systems. The sensor helps reduce costs, improve accuracy, protect against break-down.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Robot Wrist with Snake-like Mobility**

Ref. No. ZLB-119

Highly flexible extensions of robot wrists and arms have been developed enabling movements comparable to those of an elephant's trunk or a snake's body. They can be inserted into conventional industrial robots or incorporated as integral parts of self-sufficient, highly mobile robots.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Narrow-Slit Welding of Thick Metal Sheets**

Ref. No. ZLB-120

This new technological and engineering development, the narrow-slit pendulum wire welding (EDP-welding), allows the efficient and economical welding of metal sheets up to 350 mm in thickness. The system reduces energy use and material expenditure, shortens production periods and improves welding quality.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Alternating Current Aerial Dust Filter**

Ref. No. ZLB-121

Using high-voltage, alternating current, this filter effectively separates even the finest of high-resistant dusts and mists from suspensions-containing gases at temperatures up to 250° C. It is well suited to continuous and batch operations of small and medium-sized engineering plants and can be miniaturized for separation of dust in gas conduits.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Plant and Technique for Granulated Drying with Fluidized Bed Technique**

Ref. No. ZLB-122

This newly developed technique makes it possible to achieve uncomplicated and economic granulation of suspensions, solutions and melts in large quantities. The technique guarantees granulates of high quality that can trickle with hatching and abrasion resistance; prevent separation; improve storage and transportation abilities.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Pneumatic Stepping Motor**

Ref. No. ZLB-123

Newly developed stepping motor provides exact positioning of pneumatic components to meet the exacting demands of modern, flexible manufacturing and assembly lines, such as instant adjustment to a change in working conditions. The motor's applications include use in machine-tool construction, robotics industry and handling engineering.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Automatic Device for Bottling Liquid Media of Different Viscosities**

Ref. No. ZLB-124

This automatic bottling device was designed for bottling abrasive materials which cause wear on the piston and cylinder of conventional bottling equipment. It can be used to bottle acids, bases, abrasive materials, inflammable liquids as well as chemicals, foodstuffs and coating materials. The volume to be filled can be adjusted for each operation and adapted to all sizes of package.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

### **Interference-Optical Way Sensor**

Ref. No. ZLB-125

This new interference-optical way sensor is used for highly accurate linear contact measurement with a high degree of resolution. The use of modern light-wave technology offers minimum run-in times; protection against disturbances by electromagnetic fields. This precision sensor is well suited to control and ensure quality in the manufacture of optical instruments and in precision mechanics.

*For further information, contact:* Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

## **New Zealand**

### **Water-Operated Turbine**

A New Zealand firm offers its technology for a water-operated turbine to Canadian companies for sales and distribution of the turbine throughout Canada and the United States. The "Martin" water-operated turbine uses run-off, or waste, water from springs, waterfalls, drainage and small streams or diversions from lakes and rivers to create energy which can be used to power various other devices or to pump water to best advantage. The turbine needs no fuel or electricity; is easily installed; can pump in two different directions at once; can use dirty water for energy while pumping clean water from a separate water source.

*For further information, contact:* Roy Martin, Director, Martin Research and Development Limited, P.O. Box 621, Dunedin, New Zealand.

## **Switzerland**

### **Camping Grill Kit**

Available for manufacture under licence is this kit from a Swiss company. The kit includes a vertically and horizontally adjustable grill for use over an open fire; camping grill which can be used with charcoal over an open fire or with gas, electricity or coal in the home and incorporates a table; and newly developed grill accessory fish tongs specially designed to grill seafoods, such as fish, shrimp or crayfish, which can also be used to cook vegetables and certain fruits or adapted for chicken or steaks.

*For further information, contact:* CONYOU DESIGN, René Huber, Kasthoferstrasse 50, CH-3006 Berne, Switzerland; Tel: 0041-31/44 41 15.

## **United States of America**

### **Hedge Trimmer Extension Device**

A New York inventor offers his technology for a hedge trimmer extension device that can reach the tops and sides of tall bushes for trimming and clipping. It attaches to all makes of power hedge and tree cutters and trimmers to cut and trim hedges and bushes with ease and safety.

*For further information, contact:* Invention Prototypes & Marketing, 22 Walter Street, Pearl River, New York, NY 10965, U.S.A.; Tel: (914) 735-7774.



### **Insect and Roach Spray**

Available from a New York inventor for outright sale or licensing arrangement is his technology for an insect and roach spray that is claimed to keep working to kill pests longer than most sprays. A special ingredient holds the spray solution in an active form for months.

*For further information, contact:* Invention Prototypes & Marketing, 22 Walter Street, Pearl River, New York, NY 10965, U.S.A.; Tel: (914) 735-7774.

### **Electronic Early Pregnancy Testing Device**

The Iowa State University offers, for licensing arrangement or research funding, a portable electronic early pregnancy testing device for cows and swine. Based on ultrasonic technology, the device can be used to detect pregnancy in cows 14 to 18 days after breeding, and in swine 13 days after breeding.

*For further information, contact:* Dr. Steven C. Price, Biotechnology Industrial Liaison, 1010 Agronomy Building, Iowa State University, Ames, Iowa, IA 50011; Tel: (515) 294-9440.

# Requested

## **Brazil**

- Diagnostic Reagents Kits
- Digital Distributed Control Systems

## **Great Britain**

- Animal Health Care Products and Technology

## **Germany, Federal Republic of (West Germany)**

- Work Station Security Device

## **Spain**

- Irrigation Equipment
- Precision or Flow Meter Electronic Equipment
- Application Software

## **Brazil**

### **Diagnostic Reagents Kits**

Ref. No. BRE/0294/95/EN

A Brazilian company is seeking, through a joint-venture agreement, the technology to produce diagnostic reagents kits using latex agglutination, radioimmunoassay, enzymeimmunoassay, for domestic and international markets.

*For further information, contact:* E. Mastracchio, Head of Business Co-operation Centre, TASK FORCE SME, rue d'Arlon 80, B-1040 Bruxelles, Belgium. *Please quote the reference number.*

### **Digital Distributed Control Systems**

Ref. No. BRE/0293/33/EN

A Brazilian firm seeks a joint-venture arrangement to produce digital distributed control systems, technology or association for flight simulators and 32-bits industrial microcomputers plus the technology for mathematical models for industrial automation and process control.

*For further information, contact:* E. Mastracchio, Head of Business Co-operation Centre, TASK FORCE SME, rue d'Arlon 80, B-1040 Bruxelles, Belgium. *Please quote the reference number.*

## **Great Britain**

### **Animal Health Care Products and Technology**

Ref. No. 319/BE/88

Products, systems, technology and research projects are sought by a British company, through joint ventures, licences or product distribution agreement, related to farm animal health care products; animal productivity and carcass quality enhancers; dairy, beef, pig and poultry health care products; pet animal health care products; animal hygiene products; anti-parasitics; veterinary antibiotics and antibacterials; mastitis treatments; hormones for pet and farm animals; vaccines for pet and farm animals.

*For further information, contact:* PAX Technology Transfer Limited, 112 Boundary Road, London NW8 0RH, England; Tel: 01 328 8823; Telex: 268048 EXT LDN; FAX: (Gp.3) 01 624 1242. *Please quote the reference number.*

## Germany, Federal Republic of (West Germany)

**Work Station Security Device** Ref. No. 8856  
Agreements for either licensing, purchasing the know-how or in sales corporation are sought for the production of a security device for office work stations which would consist of a desk with drawers and a computer. The computer would automatically lock all desk drawers when the operator leaves the work station and unlock them when the operator returns.  
*For further information, contact:* Götz Schaudé, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

## Spain

**Irrigation Equipment** Ref. No. GAS 94  
A manufacturer in Spain of irrigation equipment incorporating fertilizers and phyto-sanitary products, seeks an exchange of technology and possible joint-venture arrangement to manufacture and market similar products.  
*For further information, contact:* François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

**Precision or Flow Meter Electronic Equipment** Ref. No. MAS 105  
A Spanish manufacturer of electric meters and tele-measurement equipment would like to produce, under licence or other similar arrangement, precision or flow meter electronic equipment. The company would also like to participate in joint design projects for electronic equipment.  
*For further information, contact:* François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

**Application Software** Ref. No. LAS 96  
Technical co-operation is sought by a Spanish company for the development of application software for a variety of products. The company also seeks reciprocal distribution agreements.  
*For further information, contact:* François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

# R&D Notes

## Video Cassette on "Technology Transfer" Available

A new video cassette illustrating many of the important challenges of technology licensing and transfer, "Technology Transfer", has been jointly produced by the Licensing Executives Society (U.S.A. and Canada), Inc. (LES U.S.A./Canada), the Institute of Electrical and Electronic Engineers and the Industrial Innovation Centre of Montréal.  
The cassette is available from LES U.S.A./Canada and can be obtained by writing: Licensing Executives Society (U.S.A. and Canada), Inc., 71 East Avenue, Suite S, Norwalk, Connecticut, CT 06851-4903, U.S.A.



## Scientific Collaborative Agreement Signed Between Canada and West Germany

A collaborative agreement on Co-operation and International Technology Transfer (CITT) has been signed between the National Research Council Canada (NRC) and the Technologie-Vermittlungs-Agentur Berlin e.V. (TVA) of West Berlin, Federal Republic of Germany (FRG).

The CITT Agreement is intended to create and maintain a co-operative framework between NRC and TVA to facilitate collaborative action in technological innovation between companies in Canada and West Berlin.

For further information, contact: J. A. (Han) Koster, Project Manager, Industrial Research Assistance Program, Collaborative Projects, National Research Council Canada, Ottawa, Ontario K1A 0R6; Tel: (613) 993-8238.

## Memorandum of Understanding

In an effort to strengthen international competitiveness of the Canadian consulting engineering industry, Industry, Science and Technology Canada (ISTC) has entered into a Memorandum of Understanding (MOU) with the Association of Consulting Engineers of Canada.

The MOU will facilitate discussions between ISTC and the industry on a number of issues of vital concern to the industry.

For further information, contact: Mercedes Ballem, ISTC, Ottawa, Ontario K1A 0H5; Tel: (613) 996-3915.

## Alberta Grant to Help MBA Students

Promising Master of Business Administration (MBA) students at the University of Calgary will have the opportunity to gain international business experience this year with the help of a grant from the Alberta Department of Technology, Research and Telecommunications.

The grant has been made to the Projects for International Technology Transfer (PROFIT) program of the University of Calgary Faculty of Management. PROFIT offers MBA students the means to help Alberta companies open up new international markets for their products and services.

For further information, contact: PROFIT, University of Calgary, 2500 University Drive N.W., Calgary, Alberta T2N 1N4; Tel: (403) 220-6331.

## University of New Brunswick Student Branch of American Nuclear Society Recognized

A group of science and engineering students at the University of New Brunswick (UNB) has been formally recognized as a student branch of the American Nuclear Society (ANS). The only other Canadian student branch of ANS is at the University of Toronto.

The aim of the ANS is the advancement of the peaceful use of nuclear technology and it is dedicated to the exchange of technical information and to the creation of an awareness of the benefits of nuclear technology.

For further information, contact: Brenda Petersen, Department of Public Relations and Information, University of New Brunswick, Fredericton, New Brunswick E3B 5A3; Tel: (506) 453-4793.

# Special Events

## Summary

### Canada

- BUSINESS OPPORTUNITIES SASKATCHEWAN  
Regina — October 1989
- AGRI-TRADE '89  
Red Deer — November 1989
- GRAPHIC TRADE '89  
Toronto — November 1989
- CANADIAN CONSTRUCTION SHOW  
Toronto — February 1990
- CANADIAN ENVIRONMENTAL EXPOSITION-CEX  
Toronto — March 1990
- CANADIAN PLANT ENGINEERING & MACHINE TOOL SHOW  
Montréal — May 1990

### Australia

- 5th ANNUAL GENERAL MEETING AND CONFERENCE OF THE INTERNATIONAL ASSOCIATION OF SCIENCE PARKS  
Adelaide — November 1989

### Bahrain

- MEFEX 90  
Bahrain — February 1990

### Belgium

- EUROTECH 90  
Brussels — April 1990

### France

- EUROPLAST 90  
Paris — June 1990
- IRC EXHIBITION  
Paris — June 1990

### Germany, Federal Republic of (West Germany)

- SYSTEMS 89  
Munich — October 1989
- PRODUCTRONICA 89  
Munich — November 1989
- IKOFA 90  
Stuttgart — June 1990
- TRANSPORT '90  
Munich — June 1990

### Hungary

- TECHEX '90  
Budapest — February 1990

### Saudi Arabia

- SAUDIAGRICULTURE 89  
Riyadh — March 1990

### Spain

- TECHNOVA 89  
Madrid — October 1989

### Turkey

- COMMUNICATIONS TURKEY 89  
Istanbul — November 1989

### United States of America

- EXPO '89  
Chicago — November 1989

## Canada

### Business Opportunities Saskatchewan 3rd Business Opportunities Marketplace

Canada Centre, Exhibition Park

Regina, Saskatchewan

October 27 to 29, 1989

*For further information, contact:* Jay-Ann King Clyde, Saskatchewan Economic Development and Tourism, 1919 Saskatchewan Drive, Regina, Saskatchewan S4P 3V7;

Tel: (306) 787-1608.

### Agri-Trade '89 Exhibition of Agricultural Products and Farm Equipment

Westerner Exposition Grounds

Red Deer, Alberta November 9 to 12, 1989

*For further information, contact:* Pat Kennedy, Red Deer Chamber of Commerce, 3017 Gaetz Avenue, Red Deer, Alberta T4N 5Y6; Tel: (403) 347-4491.

### Graphic Trade '89 Graphic Arts Printing Equipment and Supplies Exhibition

Toronto International Centre of Commerce  
Toronto

November 17 to 20, 1989

*For further information, contact:* Bernie Loveridge, Show Manager, Southex Exhibitions, 1450 Don Mills Road, Don Mills, Ontario M3B 2X7; Tel: (416) 445-6641; FAX: (416) 442-2077.

### Canadian Construction Show

Construction and Building Equipment, Supplies, Products and Services

International Centre

Toronto

February 14 to 16, 1990

*For further information, contact:* Peter McLean, Show Manager, Industrial Trade & Consumer Shows Inc., 20 Butterick Road, Toronto, Ontario M8W 3Z8; Tel: (416) 252-7791; FAX: (416) 252-9848; Telex: 06-219547 (ITCS).

### Canadian Environmental Exposition-CEX Plumbing, Heating, Air Conditioning, Ventilation Equipment and Materials

Metro Toronto Convention Centre

Toronto

March 11 to 13, 1990

*For further information, contact:* Nancy Shield, Harry Shield, H.D. Shield and Associates Ltd., 25 Bradgate Road, Don Mills, Ontario M3B 1J6; Tel: (416) 444-5225.

### Canadian Plant Engineering & Machine Tool Show

Place Bonaventure

Montréal

May 14 to 17, 1990

*For further information, contact:* Steve Utting, Group Show Manager, Industrial Trade & Consumer Shows Inc., 20 Butterick Road, Toronto, Ontario M8W 3Z8; Tel: (416) 252-7791 or (toll-free) 1-800-268-0387; FAX: (416) 252-9848; Telex: 06-219547 (ITCS).



## Australia

### 5th Annual General Meeting and Conference of the International Association of Science Parks

Convention Centre Adelaide, Australia  
November 14 to 16, 1989

*For further information, contact:* The Organising Committee, 5th Annual General Meeting and Conference, International Association of Science Parks, c/-Technology Development Corporation, Innovation House, First Avenue, Technology Park, South Australia, 5095 Australia. *OR* Australian Trade Commission, 175 Bloor Street East, Suite 316, Toronto, Ontario M4W 3R8; Tel: (416) 323-3909; FAX: (416) 323-3910; Telex: (06) 219762 AUSTRADETOR.

## Bahrain

### MEFEX '90

#### 6th Middle East Food and Equipment Show and Salon Culinaire

Exhibition Centre  
Bahrain

February 10 to 13, 1990

*For further information, contact:* Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, England; Tel: 01-486 1951/487 5831/935 4672; FAX: 01-486 8773; Telex: 24591 MONTEX G.

## Belgium

### EUROTECH '90

#### Incorporating International Fairs on Industrial Electricity, Industrial Equipment, Packing, Sub-contracting, Plastics, Materials Handling, Robotics, Industrial Hydraulics

Brussels Exhibition Centre  
Brussels, Belgium

April 24 to 28, 1990

*For further information, contact:* Foire internationale de Bruxelles, A.S.B.L./Internationale Jaarbeurs van Brussel V.Z.W., Place de Belgique/Belgiëplein, B-1020 Bruxelles/Brussel; Tel: 32/2/478 48 60; FAX: 32/2/478 80 23; Telex: 23643 foire b.

## France

### EUROPLAST '90

#### International Plastics Exhibition

Parc de Paris-Nord  
Paris

June 11 to 16, 1990

*For further information, contact:* Association pour le Développement des Matériaux de Synthèse (ADMS), 59, rue Boissière, 75116 Paris, France; Tel: (33-1) 47 27 84 86; FAX: (33-1) 47 55 18 50; Telex: 640 541.

## IRC EXHIBITION

### International Rubber Exhibition

Parc de Paris-Nord

Paris

June 11 to 16, 1990

*For further information, contact:* Association pour le Développement des Matériaux de Synthèse (ADMS), 59, rue Boissière, 75116 Paris, France; Tel: (33-1) 47 27 84 86; FAX: (33-1) 47 55 18 50; Telex: 640 541.

## Germany, Federal Republic of (West Germany)

### SYSTEMS '89

#### 11th International Data Processing and Telecommunications Exhibition

Munich Trade Fair Centre

Munich, Federal Republic of Germany

October 16 to 20, 1989

*For further information, contact:* Munich Trade Fair Corporation, Münchener Messe- und Ausstellungsgesellschaft, Messegelände, Postfach 121009, D-8000 München 12, Bundesrepublik Deutschland; Tel: (089) 51 07-0; FAX: (089) 51 07-506; Telex: 5 212 086 ameg d.

### PRODUCTRONICA '89

#### 8th International Trade Fair for Electronics Production

Munich Trade Fair Centre

Munich, Federal Republic of Germany

November 7 to 11, 1989

*For further information, contact:* UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

### IKOFA '90

#### International Food Fair

Stuttgart Trade Fair Centre

Stuttgart, Federal Republic of Germany

June 9 to 12, 1990

*For further information, contact:* Messe Stuttgart, Am Kochenhof 16, Postfach 9 90, D-7000 Stuttgart 1, Bundesrepublik Deutschland; Tel: 07 11/25 89-0; FAX: 07 11/25 89-4 40; Telex: 7 22 584 killb d.

### TRANSPORT '90

#### 4th International Trade Fair for Freight and Passenger Transport

Munich Trade Fair Centre

Munich, Federal Republic of Germany

June 19 to 23, 1990

*For further information, contact:* UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

## Hungary

### TECHEX '90

#### The Technology Exchange

Budapest Convention Centre

Budapest

February 13 to 16, 1990

*For further information, contact:* Ipari Reklám és Propaganda Vállalat, 1081 Budapest VIII, Rákóczi út 57, Hungary; Tel: (361) 136-602; FAX: (361) 133-257; Telex: 22-7224.

## Saudi Arabia

### SAUDIAGRICULTURE '89

#### 9th Agriculture, Irrigation & Agri-Industry Show

Riyadh Exhibition Centre

Riyadh, Saudi Arabia

March 11 to 15, 1990

*For further information, contact:* UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

## Spain

### TECHNOVA '89

#### International Innovation and Technology Exhibition

Recinto Ferial Casa de Campo

Madrid, Spain

October 17 to 20, 1989

*For further information, contact:* Institucion Ferial de Madrid, Recinto Ferial Casa de Campo, Avenida de Portugal, s/n.28011 Madrid, Spain; Tel: (91) 470 10 14/463 90 80; FAX: (91) 464 33 26; Telex: 44025-41674IFEMA-E.

## Turkey

### COMMUNICATIONS TURKEY '89

#### 2nd International Electronic Communications Exhibition

Istanbul Hilton Convention and Exhibition Centre  
Istanbul, Turkey

November 1 to 5, 1989

*For further information, contact:* UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

## United States of America

### EXPO '89

#### Food and Dairy Exposition

McCormick Place

Chicago, Illinois

November 11 to 15, 1989

*For further information, contact:* Dairy & Food Industries Supply Association, 6245 Executive Boulevard, Rockville, Maryland, MD 20852, U.S.A.

# Regional Offices

## NEWFOUNDLAND

ISTC  
Parsons Building  
90 O'Leary Avenue  
P.O. Box 8950  
St. John's, Nfld.  
A1B 3R9  
Tel.: (709) 772-4866  
FAX: (709) 772-5093

## PRINCE EDWARD ISLAND

ISTC  
Confederation Court Mall  
134 Kent Street, Suite 400  
P.O. Box 1115  
Charlottetown, P.E.I.  
C1A 7M8  
Tel.: (902) 566-7400  
FAX: (902) 566-7450

## NOVA SCOTIA

ISTC  
1496 Lower Water Street  
P.O. Box 940, Station M  
Halifax, N.S.  
B3J 2V9  
Tel.: (902) 426-4782  
FAX: (902) 426-2624

## NEW BRUNSWICK

ISTC  
Assumption Place  
770 Main Street  
P.O. Box 1210  
Moncton, N.B.  
E1C 8P9  
Tel.: (506) 857-4782  
FAX: (506) 857-6429

## QUEBEC

ISTC  
Tour de la Bourse  
800 Victoria Place  
Suite 3800  
P.O. Box 247  
Montreal, Que.  
H4Z 1E8  
Tel.: (514) 283-8185  
FAX: (514) 283-3315

### *Local Offices*

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Tel.: (418) 668-3084  
**Drummondville**  
Tel.: (819) 478-4664  
**Québec**  
Tel.: (418) 648-4826  
**Rimouski**  
Tel.: (418) 722-3282  
**Sept-Îles**  
Tel.: (418) 968-3426  
**Sherbrooke**  
Tel.: (819) 564-5904  
**Trois-Rivières**  
Tel.: (819) 374-5544  
**Val-d'Or**  
Tel.: (819) 825-5260

## ONTARIO

ISTC  
Dominion Public Building  
4th Floor  
1 Front Street West  
Toronto, Ont.  
M5J 1A4  
Tel.: (416) 973-5000  
FAX: (416) 973-8714

### *Local Offices*

**London**  
Tel.: (519) 645-5820  
**Ottawa**  
Tel.: (613) 993-4963

## MANITOBA

ISTC  
300 Portage Avenue, Room 608  
P.O. Box 981  
Winnipeg, Man.  
R3C 2V2  
Tel.: (204) 983-4090  
FAX: (204) 983-2187

### *Local Office*

**Thompson**  
Tel.: (204) 778-4486

## SASKATCHEWAN

ISTC  
105 — 21st Street East, 6th Floor  
Saskatoon, Sask.  
S7K 0B3  
Tel.: (306) 975-4400  
FAX: (306) 975-5334

### *Local Office*

**Regina**  
Tel.: (306) 780-6108

## ALBERTA

ISTC  
Canada Place, Room 540  
9700 Jasper Avenue  
Edmonton, Alberta  
T5J 4C3  
Tel.: (403) 495-4782  
FAX: (403) 495-4507

### *Local Office*

**Calgary**  
Tel.: (403) 292-4575

## BRITISH COLUMBIA

ISTC  
900 — 650 West Georgia Street  
P.O. Box 11610  
Vancouver, B.C.  
V6B 5H8  
Tel.: (604) 666-0434  
FAX: (604) 666-8330

### *Local Office*

**Prince George**  
Tel.: (604) 561-5158

## YUKON

ISTC  
108 Lambert Street, Suite 301  
Whitehorse, Yuk.  
Y1A 1Z2  
Tel.: (403) 668-4655  
FAX: (403) 873-5763

## NORTHWEST TERRITORIES

ISTC  
Precambrian Building  
P.O. Box 6100  
Yellowknife, N.W.T.  
Tel.: (403) 920-8578  
FAX: (403) 873-5763

## Atlantic Canada Opportunities Agency

Tel.: (toll-free) 1-800-561-7862

## FedNor

Tel.: (toll-free) 1-800-461-6021

## Western Economic Diversification

Tel.: (403) 495-4164  
FAX: (403) 495-4557

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